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Stewart Products

Here's Your Chance For Added Profits

Live dealers everywhere find Stewart Products ready money makers—fast, consistent sellers—Winter and Summer.

Profit by their experience.

Stop trying to "put across" unknown accessories. Take the sure thing—the advertised accessory—the one that's known and liked. That's the way to make your business pay.

Don't clutter up your shop with a slow moving stock.

Handle accessories like the Stewart Vacuum System. It's on over 70% of all makes of cars for 1917. And thousands of old cars still need it. It's the one system that's cured of all the ills of other gasoline systems.

The Stewart Tire Pump is another big seller. So are Stewart Warning Signals, Stewart V-Ray Spark Plugs, Stewart Speedometers for Fords.

Put in a good, strong stock of these Stewart Products.

They will mean lots of jingling dollars in your pocket before the year is over.

Act now.

STEWART-WARNER SPEEDOMETER CORPORATION

CHICAGO, U. S. A.

$10

Stewart Speedometer for Fords

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Stewart Hand Operated Warning Signal

$10

Stewart Vacuum System

$12

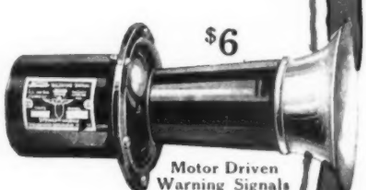
Stewart Tire Pump

$50

Warner Auto-Meter

$25

Stewart Speedometer



$6

Motor Driven Warning Signals

$1

Stewart V-Ray Spark Plug

The AUTOMOBILE

VOL. XXXVI NEW YORK—THURSDAY, FEBRUARY 1, 1917—CHICAGO NO. 5

1916 Exports Total $120,596,921

$9,416,782 More Than 1915—Trucks Decrease—Passenger Cars Increase

	1915		1916	
	No.	Value	No.	Value
Cars.	41,869	$35,045,492	61,947	$43,725,087
Trucks	22,082	59,834,246	18,903	52,870,774
Parts	....	16,300,401	....	24,001,060
Total	....	$111,180,139	....	$120,596,921

WASHINGTON, D. C., Jan. 31—The United States in the year 1916 set up a new record for automobile exports, its shipments of automobiles, trucks, and parts, amounting to $120,596,921 as compared with $111,180,139 in 1915 and $34,171,568 in 1914. Automobile exports increased nearly 50 per cent, while truck exports decreased about 9 per cent. Parts increased 50 per cent. Automobile exports amounted to 61,947, valued at $43,725,087 as compared with 41,869, valued at $35,045,492 in 1915. Truck exports numbered 18,903, valued at $52,870,774, as against 41,869 in 1915, valued at $59,834,246. Parts totaled $24,001,060 against $16,300,401 in 1915.

Cars Gain—Trucks Lose

Truck exports in December, 1916, fell below the mark established in the corresponding month in 1915. December, 1916, exports of trucks numbered 1331, valued at $3,688,314, as against 1664 in 1915, valued at $3,920,533. On the other hand, passenger car exports showed a notable increase, amounting to 4911, valued at $3,658,650 as compared with 3664 in December, 1915, valued at $2,710,758. Parts were lower in December, 1916, amounting to $1,755,335, as against $1,791,805 in the corresponding month in 1915.

Drop in November

Comparing December, 1916, with the previous month, November, shows a big drop in all departments. There were over 1000 less cars shipped in December last than in November and about 300 less trucks. Parts were about $300,000 lower. The recent action of Great Britain in cutting down imports of automobiles and the high import duty levied on automobiles by a few of the other countries has had a potent effect on shipments from the United States.

—

Kissel Adds a Twelve

CHICAGO, Jan. 29—Considerable interest has been aroused among the trade here by the appearance of a twelve-cylinder Kissel. The car incorporates a Weidely twelve-cylinder motor with the regulation overhead-valve action. It has been shown privately at the local branch of the company and will be run through a number of severe tests before being marketed. The chassis is a larger one than that of the Hundred-Point six model, but conforms in a great many respects to the same design.

—

McClaren Racine Rubber President

RACINE, WIS., Jan. 29—H. L. McClaren, former president of the Mitchell-Lewis Motor Co., Racine, Wis., has been elected president of the Racine Rubber Co. to succeed Stuart Webster, who resigned because of ill health. Mr. McClaren formerly was head of the rubber company, which at that time was owned by the same interests as the Mitchell company. Recently the tire plant was purchased by the Ajax Rubber Co., Trenton, N. J. Mr. Webster will continue as a director and as treasurer of the company.

—

Russia Bars Cars and Trucks

PETROGRAD, Jan. 25—The prohibition of the importation of vehicles other than those for railed tracks will become effective in Russia Feb. 1. Under this prohibition come carriages, omnibuses, light passenger vehicles, trucks and cars. Vehicles completely upholstered are also included.

Chicago Business Is Unparalleled

Show Attendance 20% Greater Than in 1916—Dealers' Attendance Breaks Record

CHICAGO, Jan. 30—Chicago's most successful show is half over and the volume of business done far exceeds any of the previous exhibitions. The paid attendance has been running 20 per cent ahead of last year. It is the greatest dealers' show that has ever been held in this country, according to the opinions of the leading manufacturers who are in attendance. As usual the show is nationwide in its scope. Dealers are here from the far corners of Maine and from southern California; they are here in greater numbers than ever before and are doing business on a scale hitherto unapproached. Invitations were issued to about 38,000 dealers all over the country. Each dealer was sent three tickets and this year they are not being registered, as it is impossible to get a numerical line on the dealers' attendance. Manufacturers are unanimous in their belief, however, that it has never been approached in previous years.

Distributors Know Requirements

In many respects the business of the show stands unique in the history of the industry. Instead of the usual bargaining on allotments, the distributors are ready with their list of requirements and these estimates not only include the cars sold by the greater dealers themselves, but also for the entire organization of subdealers. There is a great amount of evidence that the territory represented by the Chicago show is being more intensively cultivated than ever before. This is clearly shown by the great increase in the number of subdealers. In some quarters there has been a reluctance noted among the small-

(*Continued on page* 272)

Two Makers Raise Car Prices

Liberty $100 More, Glide $125; Braender Tires Advance 10 to 20 Per Cent

DETROIT, Jan. 26—The Liberty Motor Car Co., this city, will advance its prices on all models $100 on Feb. 1. The touring car on that date will advance to $1,195; the closed coupled four-passenger roadster to $1,195; the brougham to $2,450; and the touring Sedan to $1,395.

The company will add a Springfield body model around the middle of March. This car will sell for $1,795.

Glide Raises Price $125

PEORIA, ILL., Jan. 29—The Bartholomew Co., this city, manufacturer of the Glide Car, has raised its price from $1,125 to $1,250.

Braender Tire Prices Raised

RUTHERFORD, N. J., Jan. 25—The Braender Rubber & Tire Co., this city, has advanced its prices 10 to 20 per cent on its tires and tubes. These new prices are effective in all States except the Rocky Mountain States where they are 5 per cent more. The 28 by 3 plain tread, formerly $9.80, is $11.25; non-skid, formerly $11.25, is $12.95; the $2.90 tube is now $3.60. The 32 by 3 plain tread has risen from $15.35 to $17.40; the non-skid from $17.65 to $20; and the red tube from $3.60 to $4.60. The 36 by 4½ plain tread, is now selling at $35.40 and formerly sold at $31.45; the non-skid type sells at $40.70 as compared with $36.15; and the red tube is $8.30 as against $6.70.

Emerson General Sales Manager for Olds

LANSING, MICH., Jan. 29—P. L. Emerson has been appointed as general sales manager for the Olds Motor Works at this city. G. L. East has been made assistant sales manager. The position now occupied by Mr. Emerson has been vacant since last July, when Jay Hall resigned.

Wilson Heads Belmont Sales

TOLEDO, Jan. 29—A. J. Wilson has been made advertising and sales manager of the Belmont Motor Car Co., which was recently formed here to manufacture motor cars.

Hydraulic Buys Cleveland Welding

CLEVELAND, Jan. 30—The Hydraulic Pressed Steel Co. has decided to exercise its options for purchase of control of the Cleveland Welding & Mfg. Co., of which E. T. Heinsohn is president. The money will be paid over this week. The purchase will increase the facilities of the company in the manufacture of automobile parts. Nothing was given out at this time regarding a rumored deal by which the control of a large interest in the company was to pass to Eastern capitalists.

Chalmers Elects Officers and Directors

NEW YORK, Jan. 29—The Chalmers Motor Co. held a meeting in this city last week and elected Hugh Chalmers, president; E. C. Morse, vice-president; W. P. Kiser, secretary, and D. P. Turnbull, treasurer. The following comprise the new board of directors: Hugh Chalmers, E. C. Morse, W. P. Kiser, C. A. Woodruff, C. A. Pfeffer, C. C. Hinkley, all of Detroit, and B. Lockwood of New York.

Extensive manufacturing and selling plans were outlined. The company plans to build and sell 30,000 cars this year.

Winton Co. Re-elects Officers

CLEVELAND, Jan. 25—The Winton Co. has re-elected the following officers to serve their twenty-first annual term: President, Alexander Winton; vice-president, Thomas Henderson; secretary and treasurer, George H. Brown. The company has never had any other officers since the business was started.

White of U. S. L. Becomes Sales Mgr.

NIAGARA FALLS, N. Y., Jan. 30—John A. White, who has been connected with the U. S. Light & Heat Corp. for the past 8 years, has been promoted from manager of the Chicago office to sales manager, and will assume his new duties at once. He will be located at the home office in this city. His successor as manager of the Chicago office has not been announced.

Reo Predicts Price Increase

DETROIT, Jan. 31—Reo will probably raise its prices within a few weeks, according to a statement issued by R. H. Scott, vice-president and general manager of the company. He states that 2-year-old material contracts are expiring without possibility of renewal, and materials are advancing from 25 to 100 per cent in cost.

Durham with Stevens Motor

DETROIT, Jan. 29—B. F. Durham, who has been connected with the Maxwell Motor Co., and who is well known as "Bull Durham," has resigned his position to join the Stevens motor branch of the Moline Plow Co. as assistant sales manager.

Brown-Lipe Gear Co. Elects Officers

Chapin Retires as General Manager, But Retains Interest —Parsons New Manager

SYRACUSE, N. Y., Jan. 27—At the annual meeting of the Brown-Lipe Gear Co., Syracuse, Jan. 25, the following officers and directors were elected: Alex. T. Brown, president; W. C. Lipe, first vice-president; G. W. Sponable, second vice-president; A. E. Parsons, secretary and general manager; and E. H. Hungerford, treasurer.

The above with H. W. Chapin compose the board of directors.

Owing to the great increase in the business of the Brown-Lipe Gear Co. and the Brown-Lipe-Chapin Co., Mr. Chapin has retired from the general management of the former concern so as to devote his entire attention to the general management of the Brown-Lipe-Chapin Co..

Mr. Chapin retains his financial interest in the Brown-Lipe Gear Co. and a place on the board of directors. A. E. Parsons, the new general manager of the Brown-Lipe Gear Co., has been patent attorney for both companies since their organization. He will devote all his time to the management of the Brown-Lipe Gear Co., but will retain his interest in the firm of Parsons & Bodell, patent attorneys, Syracuse, of which he is senior partner.

The Brown-Lipe Gear Co. has under way extensive work of expansion of the plant and its facilities.

Durant and Chrysler to California

DETROIT, Jan. 27—Following the Chicago automobile show, W. C. Durant and W. Chrysler, presidents of the General Motors Co. and the Buick Motor Co. respectively, will leave for an extended trip to California.

Harry Ford Export Co. Director

DETROIT, Jan. 27—Harry Ford, president of the Saxon Motor Car Corp., has been made a director of a $5,000,000 corporation formed recently in New York and Chicago, for the extension of commerce in foreign countries. The company will conduct and operate steamship lines and railroads, buy and sell securities, and will take over the operations of a company that has been in business for the past 16 years.

Mills Joins Highway Tractor Co.

DETROIT, Jan. 27—S. W. Mills has joined the forces of the Highway Tractor Co., Indianapolis. Mr. Mills was formerly an engineer for the Fiat company.

Army Truck Standards Discussed

Chief Points Talked on Are Wheel Track, Radiators and Crankshafts

NEW YORK, Jan. 26—A further conference of the Truck Standards Division of the Society of Automotive Engineers was held in the rooms of the society here to-day, attended by W. M. Britton of the Quartermaster's Department at Washington, J. P. Utz, chairman-elect of the Standard Committee of the S. A. E. and Coker F. Clarkson, secretary, and the following members of the division, each chief engineer or truck engineer of his concern:

H. D. Church, Packard Motor Car Co., chairman.
A. L. Riker, Locomobile Co.
G. W. Smith, Nash Motors Co.
B. B. Bachman, Autocar Co.
L. P. Kalb, Kelly-Springfield Motor Truck Co.
W. R. Strickland, Peerless Motor Car Co.
W. T. Norton, Selden Motor Vehicle Co.

At this meeting the chief points discussed were wheel track, radiators and crankshafts. It was pointed out by Mr. Britton that the army was very desirous of having a uniform gage for all its vehicles; but more particularly for the 1½- and 3-ton trucks, for these must trail each other where the road has to be broken through virgin ground. Where the tracks are of different gage it is difficult for the following vehicle, if of a different measure, to negotiate the ruts. He stated that the army transport wagon tread of 61½ in. would best suit the army and also pointed out the desirability of having uniform tracks, front and rear.

—

Dunning Resigns from Chevrolet

FLINT, Jan. 29—Hugh Dunning has resigned as production manager of the Chevrolet Motor Co. and will soon become the prdouction manager of the Stevens motor branch of the Moline Plow Co.

—

Innes Resigns from Dodge

DETROIT, Jan. 27—H. L. Innes has resigned from Dodge Brothers to take the position of factory manager of the Chevrolet Motor Co. at Flint.

—

Parker Again Heads Rust Proof

DETROIT, Jan. 27—Clark W. Parker was re-elected president of the Parker Rust Proof Co. of America and Wyman C. Parker was re-elected secretary-treasurer and general manager at the annual meeting of stockholders of the company this week.

The report of the president showed that the company had made a profit on the direct business which had passed through the factory. Large contracts recently closed were not included in the assets.

J. G. Johnson was elected vice-president, E. C. Hoelzle assistant treasurer, W. M. Cornelius assistant secretary and L. Hulbert comptroller. Directors elected include H. A. Haigh, capitalist; L. G. Younglove, attorney; W. C. Parker, C. W. Parker, F. A. Richmond, merchant; G. D. Mason, architect, and J. G. Johnson, general manager of the American Car & Foundry Co.

J. D. Lucie, B. C. Layman and O. S. Johnson have joined the sales department of the company. They were formerly connected with the U. S. Tire Co.

—

Name Hayes Directors

DETROIT, Jan. 27—J. F. O'Hara and Carlton Higbie, investment bankers, were added to the board of directors of the Hayes Mfg. Co. at the annual meeting held this week. Another director will be added in the near future. All old directors were re-elected.

—

Williams with Klaxon Detroit Office

NEWARK, N. J., Jan. 29—H. R. Williams has been appointed sales engineer and manager of the Detroit office of the Klaxon Co., in charge of the factory equipment business. He was formerly with the Chanslor and Lyon Co., Seattle.

—

Enos Joins Steel Products Co.

DETROIT, Jan. 27—L. W. Enos, formerly connected with the Willard Storage Battery Co., has been appointed assistant sales manager of the Steel Products Co., Cleveland, and will handle the Michigan territory for the company.

—

Join Stephens Motor

FLINT, Jan. 27—Hugh C. Dunning, factory manager, and Fred Corbeille, assistant superintendent of the Chevrolet Motor Co., have resigned to accept positions with the Stephens Motor branch of the Moline Plow Co. at Freeport, Ill.

—

Strickland Leaves Bantam

DETROIT, Jan. 25—S. A. Strickland has resigned as mechanical and sales engineer of the Bantam Anti-Friction Co., effective Feb. 1.

—

Kerosene Carbureters for Ford

FRANKFORT, IND., Jan. 25—The Kerosene Carbureter Co., this city, has received an order from the Ford Motor Co., for 3000 carbureters. The Indiana Brass Co., this city, has been doing the machining and finishing but its other business has grown so that the Kerosene company contemplates building a factory.

Front-Away Truck for $675

Millington Drive Is Through Front Axle—$500,000 Company

CHICAGO, Jan. 24—The Millington Motor Car Co., this city, has entered the truck field with the Front-Away light delivery truck, a radical departure from previous designs in that it drives through the front axle and carries its frame unusually low.

The Millington company is a $500,000 Delaware corporation, of whose stock half is 7 per cent non-voting cumulative preferred of $100 par value. It absorbs the Millington Auto Engineering Co., which produced the Millington attachment to converting standard rear-driven trucks to four-wheel-drivers.

The Front-Away will be made in both a delivery and a runabout form, the delivery model to have a 1000-lb. capacity and to sell for $675. Save for its unusually low frame—about even with the hubs, the vehicle resembles standard designs. The engine is under the hood, which is of stream-line design and merges with a cowl dash. The radiator is a V-type similar to that on Pathfinder cars. This extends sufficiently in front of the axle to conceal the middle of the axle. The front axle is a live one, with two bevel driving gears transmitting the drive by universals inclosed within globular steering knuckles.

The chassis has wire wheels and the rear axle is of the dropped type to clear the low frame. Semi-elliptics are used all around, the front ones being shackled at the front and pinned at the rear, thus taking propulsion by a pull instead of a push and making for steadier steering. The rear springs are suspended in the usual manner. Pneumatic tires are fitted.

—

Ewald Succeeds Campbell

NEW YORK, Jan. 27—H. T. Ewald has been elected president of the Campbell-Ewald Co., advertising agency. He succeeds F. J. Campbell who resigned as president, having disposed of his interests. C. A. Sloan was elected vice-president and G. C. Brown, secretary-treasurer. Mr. Campbell will remain with the organization for a time in an advisory capacity.

Mr. Sloan will be in charge of the local office. Among the new accounts that this company has recently taken over are the Advance-Rumely Co., La Porte, Ind., Dayton Engineering Laboratories Co., Dayton, Ohio; Van Blerck Motor Co., Monroe; Bearings Service Co., Detroit; United Motors Service, Chicago, and Perlman Rim Corp., New York.

Detroit Cos. Plan Merger

Valve and Brass Works Companies To Take Action on Plan Feb. 10

DETROIT, Jan. 29—The Detroit Valve & Fittings Co. and the Detroit Brass Works will hold a joint meeting of stockholders on Feb. 10 to take action on recommendations by the directors of each that the two corporations be merged. Both companies are large manufacturers of parts for automobiles.

Preliminary to the working out of the proposed merger the directors recommend that the stockholders approve an increase in authorized capital stock of each corporation and the distribution of a stock dividend among the shareholders of each.

To Increase Stock

It is proposed to increase the authorized capital stock of the Detroit Valve & Fittings Co. from $500,000 to $1,500,000 and to distribute a 30 per cent dividend in stock to the stockholders, and to increase the authorized capital of the Detroit Brass Works from $400,000 to $500,000, giving shareholders a 10 per cent stock dividend, this dividend in the latter company being made to simplify the merger.

—

Makers Organize Workmen's Bank

DETROIT, Jan. 31—The Morris Plan Bank, with $500,000 capital, has been organized to loan money to working men. The organizers include Hugh Chalmers, W. C. Briggs, Roy Chapin, Edward Denby, Harry Ford, F. B. Leland, R. P. Joy, H. M. Leland, E. W. Loomis, L. G. Ollier and Alvan Macauley, all automobile and parts makers.

—

National Acme Holds Annual Meeting

CLEVELAND, Jan. 27—As was foretold in a recent issue of THE AUTOMOBILE, the stockholders of the National Acme Co. declared a quarterly dividend of 1½ per cent, payable March 1, at their annual meeting held Jan. 24, besides electing a considerable number of new directors to the board, and planning several additional buildings.

Seven new directors including C. S. Eaton, A. H. Wiggins, president of the Chase National Bank of New York, G. L. Stone of Hayden, Stone & Co., of Boston, H. L. Dillon, W. F. McGuire, Detroit, A. W. Hopkins and W. R. Mitchell, members of the active staff of the company, were added.

Officers elected were W. B. D. Alexander, president, E. C. Henn, vice-president and general manager, A. W. Henn, secretary and treasurer.

It is understood that earnings are at the rate of 27 to 30 per cent on the stock. For the past 18 months the company has only been able to fill orders for old customers. The capacity of the company will be increased 100 per cent by the erection of a 6-acre plant ordered by the stockholders.

The stock will soon be listed on the New York and Cleveland stock exchanges.

—

Rood Resigns from F. S. Carr & Co.

BOSTON, Jan. 26—W. R. Rood, vice-president of F. S. Carr & Co., 31 Beach Street, Boston, resigned his position and his new connection is not yet announced. Mr. Rood is well known throughout the industry, and has been the active sales manager of the above organization for the past 8 years.

—

To Improve Detroit Financial Facilities

DETROIT, Jan. 31 — The Michigan branch of W. P. Bonbright & Co., Inc., investment bankers, has been taken over by the following for the purpose of increasing the financial facilities for manufacturers in this city: W. C. Briggs, of the Briggs Mfg. Co.; Roy Chapin and Howard Coffin, of Hudson; L. J. Hoover, of the Hoover Steel Ball Co.; E. W. Lewis, of the Timken Detroit Axle Co.; Percy Owen, of the Liberty Motor Car Co.; B. F. Tobin, of the Continental Motors Corp., and others.

Mr. Bonbright will retain a substantial interest in the new company in Detroit. At present he has no provision for the financing of large manufacturers who are forced to make their loans in other cities. This new institution will handle such business.

—

Edge Agricultural Machinery Director

LONDON, Jan. 13—S. F. Edge has been appointed by the Ministry of Munitions in charge of the manufacture and importation of agricultural machinery. He was one of the men earliest in the racing and business ends of the automobile industry here. He was associated for a number of years with the Napier company. Upon retiring from this line of business he became an expert in agriculture.

—

Hyatt Creates Farm Machinery Dept.

CHICAGO, Jan. 29—F. N. G. Kranich has joined the engineering staff of the Hyatt Roller Bearing Co., this city, and will devote his entire attention to the implement and farm machinery end of the company's work. Under his direction there will be a special department devoted exclusively to the application of Hyatt bearings for all agricultural machinery other than tractors.

Plan To Classify Gasoline

Proposal To Govern Sale of Fuel by Dividing Into Three Grades

DETROIT, Jan. 30—Facts now being gathered in Washington are to be used in an ordinance governing the sale of gasoline in this city, if the plans of J. C. McCabe, superintendent of the municipal department of safety engineering, carry. Mr. McCabe has just returned from Washington, where he was in conference with government experts regarding the gasoline problem.

The proposed plan calls for a division of three classifications of gasoline so that motorists will know what grade they are securing. The first two, class A and class B, will be known as automobile fuel. Class C will be for use in stationary engines only.

Experts here claim that during the winter months the gasoline is frequently more kerosene than gasoline, and expect to attach a penalty to the classification ordinance amounting to $100 to insure owners against securing inferior grades. McCabe's idea is to specify the "end points" of the distillation temperatures (see page 301).

—

Percy Martin English Engine Controller

LONDON, Jan. 13—Percy Martin has been appointed engine controller by the Ministry of Munitions. He has been given control of the supply of all internal combustion engines required by the fighting services and in agricultural machinery. Mr. Martin was born in the U. S. A., has served in the Austrian Government arms factory, has been for 12 years managing director of the Daimler company, and was appointed recently to the Air Board, which controls the production of government aeroplanes. The board, consisting of three men, has no authority, however, over the use of aeroplanes once they are furnished to the British army or navy.

—

42-Acre Plant for Redden

NEW YORK, Jan. 31—The Redden Motor Truck Co., Detroit, as reported in THE AUTOMOBILE for Jan. 11, has received the backing of a large financial group in the West, who have placed at its disposal 42 acres of factory space at Jackson, Mich. The company plans to turn over its truck attachment sales of the country to approximately 2000 truck merchants located in the natural selling territories.

It is reported that officials of the Briscoe Motor Corp. have purchased the company.

Two New Day-Elder Trucks

1½ and 2½ Tonners Added—Junior Type Increased from 1250 to 1500 Lb. Capacity

NEW YORK, Jan. 27—Two new models have been added to the line of the Day-Elder Motors Co., Newark, N. J., prices have been readjusted and the capacity of the Junior model has been increased from 1250 lb. to ¾-ton. The new models are a 1½-ton and 2½-ton. The line and prices now are: ¾-ton, $975; 1-ton, $1,250; 1½-ton, $1,500, and 2½-ton, $1,985.

The two new models are similar to the older ones in general outline and have worm drive.

—

Pennsy Concentrates on Car

PITTSBURGH, Jan. 27—Production of its commercial model has been discontinued by the Pennsy Motors Corp., this city. This concern was formerly the Kosmath Co., Detroit, manufacturing a vehicle from the designs of E. T. Birdsall. When it reorganized and moved to Pittsburgh it added a passenger model. From now on this will be the exclusive product of the concern.

—

15,000 Maxwell 1-Ton Trucks

NEW YORK, Jan. 27—Walter E. Flanders, president of the Maxwell Motor Co., Detroit, Mich., has stated that as a result of the reception of the new 1-ton Maxwell truck exhibited in the Hotel Biltmore during show week here, definite plans for a production of 15,000 of the vehicles have been formulated.

—

Globe Trucks to Be Made in St. Louis

ST. LOUIS, Jan. 29—Globe trucks are to be made in St. Louis in the future. The Globe Motor Truck Co. of this city has taken over the assets of the business formerly conducted under a similar name at Northville, Mich. The Globe truck until recently was made by a department of the Globe Furniture Co., Northville, Mich. The principal model is a 6-cylinder 2¼-tonner.

—

Pullman Staff Reorganized

YORK, PA., Jan. 30—As an essential feature in the reorganization of the Pullman Motor Car Co. and with a view to increasing the efficiency of its organization and rendering a better service to its dealers, its official staff has been entirely revamped.

The office of general manager, formerly occupied by H. W. Hayden, has been abolished and in its stead all departments will report to the operating board, consisting of Messrs. Keyworth, Hoff and Schmidt. Sales, advertising and purchases will be under the jurisdiction of A. R. Cosgrove, assisted by R. E. Trout, E. W. Van Duzen and H. C. Curtis.

Finance and accounting will be under the supervision of H. P. Jones. Service, stock and field service will be under S. L. Fuller; cost accounting will be under the direction of G. Ed. Schwartz. Factory production will be under the supervision of Charles G. Schwartz. Office management will be in charge of Mr. Delabar.

—

Franklin Doubles Car Output

SYRACUSE, Jan. 27—The H. H. Franklin Mfg. Co., this city, is now turning out thirty cars a day, or at the rate of 9000 a year. This is double the rate of production a year ago, the increased business having necessitated large addition to the plant. The company has no cars in storage.

—

Macon Motor Car Co. Takes Over All-Steel Assets

MACON, MO., Jan. 25—The Macon Motor Car Co., this city, has been organized to take over the business and assets of the All-Steel Motor Car Co., which was recently dissolved by order of the court, The new company is capitalized at $600,000, one-half of which is fully paid up. Judge N. M. Shelton has been appointed as trustee, to receive the stock of the old company and issue stock in the new one in lieu thereof. The old stockholders will not only receive the full amount of stock owned by them, but new stock in Macon company, to the amount of $85,000, will be distributed among them pro-rata, in addition thereto. The personnel of the board has not been determined.

—

Imperial Wheel Has Prosperous Year

FLINT, Jan. 27—The Imperial Wheel Co. which manufactures wheels for the Buick Motor Car Co., Chevrolet Motor Car Co., Dort Motor Co., and the Oakland Motor Car Co., has increased its business in the 4 years of its existence until it is now selling 400 per cent more wheels than during the first year.

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Pallau Steel Spring Elects Officers

DETROIT, Jan. 27—The stockholders of the Pallau Steel Spring Co. of Mt. Clemens, Mich., held their annual meeting this week and elected J. N. O'Brecht, president, A. T. Donaldson, vice-president, P. J. Ullrich, secretary and A. Marlette, treasurer. Directors chosen include A. T. Donaldson, J. N. and L. O'Brecht, R. A. Waterbury, P. J. Ullrich, W. Kruse and F. E. Nellis of Mt. Clemens, and Andrew Healey and A. Featherstone of Detroit.

To Improve Industrial Efficiency

Standardization of Welfare Work and Education, Patriotic Congress Plan

WASHINGTON, D. C., Jan. 27—Improvement of our industrial efficiency through Americanization of the workers might be characterized as the keynote struck at the 3-day Congress of Constructive Patriotism brought to a close here to-day. While the scope of the subjects considered was very broad there were three addresses made which contained matters of interest to manufacturers in the automobile field. These were: Americanization by Industry, by Miss Frances A. Kellor, National Americanization Committee, New York; Industrial, by Howard E. Coffin, chairman of Committee on Industrial Preparedness, Naval Consulting Board; and Americanizing Detroit, by Walter C. Piper, former president National Association Real Estate Boards, Detroit, Mich.

Miss Kellor, after pointing out that seasonal employment means continual shifting about for the workers and overtime work and night and day shifts nullify evening school possibilities, proposed a comprehensive movement to Americanize the workers by standardizing welfare work, educating the workers and improving plant management.

Mr. Coffin, after reviewing the work of the Naval Consulting Board, pointed out our lack of industrial preparedness for turning factories quickly into munitions works. He stated that a text book on munitions work is being prepared. The work accomplished by the Committee on Industrial Preparedness of the Board has now been turned over to the newly created Council of National Defense.

Mr. Piper touched on the welfare work of the Americanization Committee of the Detroit Board of Commerce in cooperation with Detroit manufacturers to further education of workers by night schools and to classify foreign workers to facilitate naturalization. The policy of "Americans First" adopted by the Packard company and other automobile makers is found very effective.

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Discher Gets Bumper Injunction

MILWAUKEE, WIS., Jan. 27—A preliminary injunction has been granted G. F. Discher, president and general manager of the Gemco Mfg. Co., this city, against the Shadbolt & Boyd Iron Co., prohibiting the sale of an automobile bumper manufactured by the Emil Grossman Mfg. Co., pending trial of a suit for in-

fringement. The injunction covers patent No. 1,052,224, relating to a bumper bracket having a lug, which bears against the front end of the automobile frame side member, and an adjustable clamp, using a transverse bolt passing through two vertical slots, one on each side of the frame member.

The injunction covers the eastern district of Wisconsin. The Grossman company will appeal the decision.

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Racine Rubber's 1916 Net Profit $720,189

NEW YORK, Jan. 29—The Racine Rubber Co. in its report to the local Stock Exchange showed a net profit in 1916 of $720,189, compared with $540,497 in 1915 and $573,352 in 1914. Its surplus amounted to $894,193. Its gross income in 1916 amounted to $4,788,171 and its merchandise cost to $3,568,886, leaving an operating profit of $1,219,285.

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Gasoline in Savannah Advanced 2 Cents

SAVANNAH, GA., Jan. 30—Gasoline prices in this city have been advanced 2 cents a gallon to 22 cents. Further advances are expected.

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Louisiana and South Carolina Gasoline 1 Cent Higher

CHARLSTON, S. C., Jan. 30—South Carolina gasoline prices have been advanced 1 cent a gallon to a maximum of 26½ and minimum of 24½, and 1 cent a gallon in Louisiana to 23 maximum and 22 minimum.

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N. Y. Gasoline Prices Up 1 Cent

NEW YORK, Jan. 30—Gasoline prices in this city have risen 1 cent to 23 to garages and 25 cents a gal. to consumers. This puts the price back to that prevailing between Aug. 7 and Sept. 5, 1916.

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Gasoline 1 Cent Higher in Houston

HOUSTON, TEXAS, Jan. 25—Gasoline has gone up in price 1 cent a gallon to a maximum of 23 cents and a minimum of 22 cents, tank wagon basis.

$7,518,434 Is Ajax Income

1916 Net Profits $548,123—Profit and Loss Surplus $139,247

NEW YORK, Jan. 29—The Ajax Rubber Co., in its report to the New York Stock Exchange, shows a gross income from Aug. 31 to Dec. 31, 1916, of $7,518,434, and net profit from trading of $548,123. Profit and loss surplus amounted to $139,247.

The complete report follows:

Gross income	$7,518,434
Miscellaneous debits	5,909,702
Gross profit	$1,608,732
Operating expenses, depreciation, etc.	1,060,609
Net profit from trading	$548,123
Dividends paid	408,876
Profit and loss surplus	$139,247

Balance sheet of the Ajax Rubber Co., Inc., as of Dec. 31, 1916, reported to the New York Stock Exchange, follows:

Assets	
Real estate, machinery, etc	$672,156
Cash on hand and in banks	255,901
Notes receivable	50,468
Personal accounts	1,725
Accounts receivable	944,461
Inventories	1,715,592
Deferred assets	102,409
Good will	930,965
	$4,673,677

Liabilities	
Capital stock	$4,000,000
Accounts payable	393,055
Reserves for depreciation, etc	141,375
Profit and loss surplus	139,247
	$4,673,677

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Lee Rubber Passes Dividend

CONSHOHOCKEN, PA., Jan. 26—The directors of the Lee Rubber & Tire Corp., this city, passed the dividend on the stock. Heretofore 50 cents a share regular and 25 cents a share extra were disbursed quarterly. Labor troubles which decreased production and a general increase in the cost of crude materials are the reasons for the passing of the dividend.

The directors have considered it wise to conserve the surplus for the development of its business. The company has expended a considerable sum of money in completing a new mill for the manufacture of miscellaneous goods, in which operations have recently been started, and in putting in additional machinery and equipment which should be installed in the early part of the year and which will nearly double its capacity.

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Templar Offers Stock to Public

CLEVELAND, Jan. 29—The Templar Motors Corp. is offering its stock to the public. The price is $10 per share, which is its par value. The company recently received the approval of the Ohio Securities Commission.

Officers of the company are: M. F. Bramley, president of the Cleveland Trinidad Paving Co., president; A. Dean, chief engineer the Ferro Machine & Foundry Co., vice-president, E. W. Davis, president of the Davis & Farley Co., treasurer; W. O. Cooper, manager of organization.

The engineering department is composed of A. M. Dean who was formerly the chief engineer of the Pope-Hartford Automobile Co.; P. F. Hackethal, recently assistant engineer of the Mercer Automobile Co.; Allen Bartlett, who was formerly the experimental engineer of the Stearns Automobile Co., and M. E. Morningstart, formerly of the Chalmers engineering department.

The company states that its engines are under construction and that factory plans are being given consideration.

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Copper and Aluminum Higher

NEW YORK, Jan. 31—This week's materials' markets were featured by a rise in aluminum and copper prices and a drop in rubber. Aluminum has risen to 58 cents a pound, a gain of 2 cents; copper has gone up 1½ cents a pound to 32½ cents; rubber prices have declined 1 cent a pound on Para and 2 cents on Ceylon grades. Sulphuric acid has declined 50 cents a gallon to $1.

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Goodrich Has $5,500,000 Surplus

NEW YORK, Jan. 25—Net profits of approximately $9,550,000 were made by the B. F. Goodrich Co., in 1916, after making full provision for all maintenance charges, depreciation, bad and doubtful debts, and other items. The surplus in the year just closed was close to $5,500,000.

This amount, added to the surplus carried over as at Dec. 31, 1915 of $10,580,000 shows undivided profits of approximately $14,900,000 after deducting the four quarterly dividends of 1¾ per cent on the preferred and 4 per cent on the common outstanding, together with the following provisions: $700,000 for the redemption of preferred stock; $121,460 representing the reduction of preferred

Daily Market Reports for the Past Week

Material	Tues.	Wed.	Thurs.	Fri.	Sat.	Mon.	Week's Changes
Aluminum, lb.	.56	.56	.56	.56	.56	.58	+ .02
Antimony, lb.	.16	.16½	...	.19½	.19½	.19½	+ .03½
Bessemer Steel, ton	65.00	65.00	65.00	65.00	65.00	65.00	...
Copper, Elec., lb	.31	.31	.31	.32	.32	.32½	+ .01½
Copper, Lake, lb	.31	.31	.31	.32	.32	.32½	+ .01½
Cottonseed Oil, bbl	13.20	12.40	12.50	12.40	12.40	12.40	— .80
Fish Oil, Menhaden, Brown	.73	.73	.73	.74	.74	.74	+ .01
Gasoline, Auto, bbl	.22	.22	.22	.22	.22	.23	+ .01
Lard Oil, prime, gal	1.35	1.35	1.35	1.35	1.35	1.35	...
Lead, 100 lbs	7.80	8.00	8.00	8.12½	8.13	8.25	+ .45
Linseed Oil, gal	.95	.95	.95	.95	.95	.95	...
Open-Hearth Steel, ton	65.00	65.00	65.00	65.00	65.00	65.00	...
Petroleum, bbl., Kans., crude	3.05	3.05	3.05	3.05	3.05	3.05	...
Petroleum, bbl., Pa., crude	1.70	1.70	1.70	1.70	1.70	1.70	...
Rapeseed Oil, refined, gal	1.00	1.00	1.00	1.00	1.00	1.00	...
Rubber, Fine Up-River, Para, lb	.76½	.76½	.76½	.76½	.76½	.75½	— .01
Rubber, Ceylon, First Latex, lb	.77	.78	.76½	.76	.76	.75	— .02
Sulphuric Acid, 60 Baume, gal	1.50	1.00	1.00	...	1.00	1.00	— .50
Tin, 100 lb	45.50	45.38	45.38	45.38	45.38	45.63	+ .13
Tire Scrap, lb	.06½	.06½	.06½	.06½	.06½	.06½	...

purchased from cost to par, and a further amount of $100,000 appropriated for pension fund.

At the regular quarterly meeting of the directors on Jan. 24 a dividend of 3½ per cent was declared on the preferred, payable 1¾ per cent April 2 and 1¾ per cent July 2. A quarterly dividend of 1 per cent was declared on the common, payable May 15.

The directors voted, subject to the approval of the stockholders at their annual meeting March 14, to retire 9000 shares of preferred prior to July 1, 1917. This makes a total retirement of 36,000 shares covering charter provision for retirement of preferred up to July 1, 1917.

The net earnings for 1916 were less than those of 1915, which is largely due to the fact that advances in selling prices have not kept pace with rapidly increasing costs.

Official figures show a return to common stockholders of 12.73 per cent as compared with 17.17 per cent in 1915 and 5.6 per cent in 1914.

The company continues to pay for its plant extensions out of earnings. That is why the dividend on Goodrich common has been kept to 4 per cent.

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Ratify Prest-O-Lite Increase

NEW YORK, Jan. 26—At a special meeting of the Prest-O-Lite Co., yesterday, the plan for increasing the capital stock of the company from 80,000 to 100,000 shares, making the amount of the stated capitalization $1,000,000, was ratified.

Securities Lack Demand

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Low Price of General Motors Has Potent Effect on Rest of Issues

NEW YORK, Jan. 31—A sudden determination on the part of a few floor traders yesterday to bring down the price of General Motors had a most potent effect on the rest of the motor issues. General Motors had been selling at 119½. For no reason other than the fact that General Motors pays only 4 per cent and was out of line with some stocks which pay more and sell for less was the stock made the object of the bearish attack. Though they succeeded in bringing down prices about 3 points, the stock was left alone by the public, which relied more on earnings than on the values of dividends. Studebaker dropped 2 points in the flurry and Maxwell 1 point.

Up to Monday automobile and accessory issues held fairly strong. A few of the issues were from a fraction to 7 points higher than the previous Monday. Losses were slight.

The Paige-Detroit company has listed on the curb 200,000 shares of common and 150,000 preferred, par value $10.

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New S. R. B. Reorganization Plan

PHILADELPHIA, Jan. 30—The Standard Roller Bearing Co. protective committee plans a new reorganization plan as a result of the decree of the United States District Court of New Jersey directing the sale of all the property of the company. An offer has been received for the purchase of the common and preferred stock at $7 per share.

The consent of at least 80 per cent of the stock is required, and also that the sale of the company's assets and properties take place by Feb. 27.

The New York syndicate which makes the offer has deposited $10,000 as a guarantee of good faith. The committee requests deposits of stock with the Bankers' Trust Co. of New York.

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Dividends Declared

Republic Rubber Co., quarterly of 2 per cent on common, payable Feb. 1 to stock of record Jan. 25, and 1¾ per cent on preferred, payable March 1 to stock of record Feb. 20.

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Harroun's Michigan Stock Approved

DETROIT, Jan. 30—The Harroun Motor Co. has been permitted by the Michigan Securities Commission to sell $1,000,000 worth of treasury stock in this State, provided the original promoters, meaning Mr. Harroun and his associates, place $4,000,000 of their stock in escrow with the commission. This stock is to be held until the company is able to pay 6 per cent on the entire $10,000,000 capitalization. When the stock is escrowed the company may sell $1,000,000 of the treasury stock in Michigan, paying a commis-

Automobile Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge
Ajax Rubber Co.	74¼	75	+2
J. I. Case T. M. Co. pfd.	85	86	..
Chalmers Motor Co. com.	32	33	+7
Chalmers Motor Co. pfd.	..	..	..
*Chandler Motor Car Co.	99	100	..
Chevrolet Motor Co.	110	115	—5
Fisher Body Corp. com.	37	41	..
Fisher Body Corp. pfd.	93	96	—1
Fisk Rubber Co. com.	75	85	..
Fisk Rubber Co. 1st pfd.	110	115	..
Fisk Rubber Co. 2d pfd.	90	100	..
Firestone Tire & Rubber Co. com.	144	146	+4
Firestone Tire & Rubber Co. pfd.	108	109	+1
*General Motors Co. com. (new)	114¼	114⅝	..
*General Motors Co. pfd. (new)	91½	91⅞	..
*B. F. Goodrich Co. com.	59¼	59¾	— ¾
*B. F. Goodrich Co. pfd.	111	111⅛	+ ½
Goodyear Tire & Rubber Co. com.	277	280	—1
Goodyear Tire & Rubber Co. pfd.	107½	108¼	..
Grant Motor Car Corp.	7	9	..
Hupp Motor Car Corp. com.	5	5¼	+2
Hupp Motor Car Corp. pfd.	..	..	..
International Motor Co. com.	15	20	—3
International Motor Co. 1st pfd.	65	75	—3
International Motor Co. 2d pfd.	25	40	..
*Kelly-Springfield Tire Co. com.	58½	60	— ½
*Kelly-Springfield Tire Co. 1st pfd.	90	95	—2½
*Lee Rubber & Tire Corp.	23½	24	+ ½
*Maxwell Motor Co. com.	54¾	55½	—3¾
*Maxwell Motor Co. 1st pfd.	72	74	+ ¼
*Maxwell Motor Co. 2d pfd.	38	39	— ½
Miller Rubber Co. com.	254	256	+6
Miller Rubber Co. pfd.	105¾	106¾	—1¾
Packard Motor Car Co. com.	..	160	..
Packard Motor Car Co. pfd.	101½	102	+1
Paige-Detroit Motor Car Co.	40¾	41	+ ½
Peerless Truck & Motor Corp.	16	19	—1
Portage Rubber Co. com.	166	169	+2
Regal Motor Car Co. pfd.	27	35	..
Reo Motor Car Co.	37½	38	—1¼
Saxon Motor Car Corp.	63	65	—1
Springfield Body Corp. com.	77	83	..
Springfield Body Corp. pfd.	110	120	..
Standard Motor Construction Co.	5½	6½	..
Stewart-Warner Speed. Corp. com.	99¼	100¼	+ ¼
*Studebaker Corp. com.	104½	105½	—3½
*Studebaker Corp. pfd.	106½	108½	—2
Swinehart Tire & Rubber Co.	84	86	..
United Motors Corp.	41⅞	42¼	—5⅞
*U. S. Rubber Co. com.	59¾	60	— ⅜
*U. S. Rubber Co. pfd.	109¼	110¼	—1
White Motor Co.	51	52	..
*Willys-Overland Co. com.	35⅝	35⅝	— ⅞
*Willys-Overland Co. pfd.	97½	98½	..

*At close Jan. 29 ,1917. Listed New York Stock Exchange. Quotations by John Burnham & Co.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE

ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co.	..	37	..
Chalmers Motor Co. com.	..	..	..
Chalmers Motor Co. pfd.	..	..	..
Continental Motor Co. com.	38	38⅞	..
Continental Motor Co. pfd. (new)	98½	..	—1
Ford Motor Co. of Canada	..	264	..
General Motors Co. com.	..	..	..
General Motors Co. pfd.	..	..	..
Maxwell Motor Co. com.	54	56	—3
Maxwell Motor Co. 1st pfd.	..	..	..
Maxwell Motor Co. 2d pfd.	..	..	..
Packard Motor Car Co. com.	..	160	..
Packard Motor Car Co. pfd.	..	102	..
Paige-Detroit Motor Car Co.	40¾	41	..
W. K. Prudden Co.	49¾	50½	+ ½
Reo Motor Car Co.	37½	37¾	—1⅜
Studebaker Corp. com.	106	108	—2
Studebaker Corp. pfd.	..	..	..
C. M. Hall Lamp Co.	29¾	30½	..

INACTIVE STOCKS

Atlas Drop Forge Co.	37	..	+1½
Kelsey Wheel Co.	50	54	..
Regal Motor Car Co. pfd.	27	35	..

sion not to exceed 10 per cent for brokerage.

All advertisements regarding such sale must be first submitted for the commission's approval. The attorneys for the Harroun company state that the provisions imposed by the commission are accepted.

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Chicago Show Business Unparalleled

(*Continued from page* 265.)

er dealers, which has been attributed to some extent to the increase in prices. ticularly noticed in the dealers having the country territory. For this class of dealer a raise in price from $1,000 to As would be expected, this has been par- $1,200 represents quite a difficulty to overcome.

On the whole allotments are running 50 per cent ahead of a year ago. The great increase in production scheduled by the larger concerns is a true interpretation of the condition of the country. With many it is not a case of how many cars they can sell but how many they can get. Naturally, with the freight-car situation as it is the Chicago territory is considerably affected. One of the results of this is that buyers with foresight are ordering their cars 2 months before they ordinarily would.

Cars are being sold at retail right off the floor. This is not counted upon as one of the results of the show, and where it is done it is simply an added amount taken in. One of the most expensive cars exhibited was sold off the floor at retail and paid for in cash.

The accessory dealers have found the same conditions. One prominent motor manufacturer who comes to the show more as a part of his advertising program than as a matter of direct business was surprised to find that deals could be made right on the floor. Other accessory men in other fields found the atmosphere charged with valuable inquiries. The per-:entage of the attendants at the show who actually come to do business is unbelievably great. The show is proving to be Chicago' greatest and the intensive selling and business interest manifested presages a prodigious business turnover for the coming year.

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Pennsylvania Rubber Expands

NEW YORK, Jan. 22—The Pennsylvania Rubber Co. has completed additions to its factories at Jeannette, Pa., to increase the output of the plant to 2500 tires per day, a production increase of 500 per cent for the past 3 years.

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Daniels Represents Bausch Gear Dept.

SPRINGFIELD, MASS., Jan. 29—The gear department of the Bausch Machine Tool Co., this city, will be represented by H. A. Daniels.

Japanese Company To Make Cars

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Tokio Firm To Manufacture Four-Passenger—To Use Cheap Petroleum

TOKIO, Jan. 29—The European war has forced Japan manufacturers to enter the autcmobile business. The Nippon Sharyo Kaisha (Japanese Vehicle Co.) has undertaken the manufacture of cars in designs adapted to the peculiar needs of Japan. The company will make 10-hp. cars with accommodations for four passengers each, which is considered as sufficient in this country. These cars will be of the width of a jinrikisha and will consume cheap petroleum. Their selling price will be about $500.

—

National Daylight-Saving Convention Opens 2-Day Session

NEW YORK, Jan. 31—The National Daylight-Saving Convention opened a 2-day session yesterday at the Hotel Astor. The convention is united on the principle but divided on its application. Some of the advantages which, the speakers said, the plan would result in were better health of workers generally, in that they would have more time for daylight recreation after working hours, great economy in lighting bills and diminished straining of the eyes of workers during the last hour before going home.

The only division of opinion among the delegates appears to be as to just when to set the clock forward and for how long. One faction would make the country rise early throughout the year. Most of the delegates at the convention seemed to favor the forward movement for only 5 or 5½ months per year.

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Hancock Co. Giving Bonus to Workers

CHARLOTTE, MICH., Jan. 29—The Hancock Mfg. Co., which makes automobile accessories, will shortly distribute $8,000 among forty-two employees in amounts varying from $100 to $400 as shares of the company's profits. The amount paid is based on the length of service.

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To Incorporate Tire Protector Business

STEVENS POINT, WIS., Jan. 29—Incorporation of the steel tire protector business founded at Stevens Point, Wis., several years ago, by J. J. Bukolt, is now under way and within a short time articles will be filed in behalf of a company to be capitalized at $200,000. There is now available for the purposes of this business a large factory building just vacated by the Automatic Cradle Mfg. Co., of which Mr. Bukolt also is president, to take occupancy of a new group of industrial buildings. New equipment is being purchased and will be delivered in time to commence manufacturing operations on tire protectors on a large scale by May 1. During 1916, more than 2000 sets of protectors were manufactured, and booked orders call for nearly twice that number.

—

Charter Oak Leases Plant

NEW BRITAIN, CONN., Jan. 25—The Eastern Motors Syndicate, manufacturer of the Charter Oak car, has leased a plant in this city, containing about 15,000 sq. ft. of floorspace. The building is one-story and 118 by 110 ft. The initial appearance of the car will be at the Boston Show in March.

—

Fisk to Add Mill Building

CHICOPEE FALLS, MASS., Jan. 26—The plant of the Fisk Rubber Co., this city, will be doubled in the near future by the addition of a mill building. It is 60 by 105 ft. and six stories high. By reason of this expansion the production will be materially increased and employment will be given to more men. The floorspace devoted now to the manufacture of tires exclusively totals 29 acres.

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MacInnes Resigns from Advertising Agency

RACINE, WIS., Jan. 29—W. J. MacInnes has resigned as manager of the Western Advertising Agency, this city, to join the service staff of the Mahin Advertising Co. Among Mr. MacInnes' former connections are the General Motors Co., Editor of *Business*, Detroit, advertising manager and assistant publisher, St. Joseph, Mo., *Evening Press* and automobile editor of the Chicago *American*.

—

$60,000 Minneapolis Plant for Oldfield

MINNEAPOLIS, Jan. 27—Lee Oldfield, former automobile racer, will expand his engine making business here and has plans for a $60,000 factory in the Minneapolis Industries Assn. new tract. He heads the Oldfield Motors Corp., which makes the Oldfield rotary aeroplane engine. Quarters at 2335 Central Avenue will be abandoned June 15 for the new plant, which will have 400 ft. of trackage.

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Rainier Installed in New Flushing Plant

FLUSHING, N. Y., Jan. 29—The Rainier Motor Corp. has moved into its new plant at Flushing and is producing ten trucks daily. The executive and sales offices have been transferred here from the New York showrooms which are now used exclusively for retail sales business. The company has recently established eight agencies in the Middle West, South, and Pacific Coast.

Plan to Change State Regulations

Amendments Include Increased Taxes, Headlight Glare, Mirrors, Better Brakes

NEW YORK, Jan. 29—Many changes in the automobile laws, both objectionable and favorable, are being considered by the various State legislatures now in session. The increasing number of automobiles has been responsible for a number of changes in the examination of applicants for licenses. In some cases these are most stringent, with the purpose of further safeguarding life. Along these same lines are bills further restricting the use of glaring headlights, requiring every motor vehicle to be provided with good brake and horn, and the use of mirrors.

The need of good roads and their upkeep has been the means of some drastic automobile and commercial vehicle bills being passed or suggested. Last week the Hewitt bill in New York State was reported favorably by the assembly and senate committees. This bill places a severe tax on motor trucks, omnibuses, taxicabs and rented cars.

It is expected that the license fee for automobiles in Illinois will be increased at the present session of the legislature.

Pennsylvania is contemplating a complete change in its automobile laws. According to amendments there will be but one law for automobile owners and every operator will be forced to take an examination and must have a driver's license. Dealers' fees are to be increased from $10 to $15; the power of headlights fixed and their light is forbidden to rise above 42 in. from the surface on which the vehicle stands; and the exceeding of 24 m.p.h. is to be prima facie evidence of recklessness.

Headlight Provisions

The headlight question is receiving much attention by the Connecticut legislature at its session. All motor vehicles are to have their headlights regulated so as not to rise above 42 in. from the ground and the glare shall not extend over 100 ft. ahead of the vehicle. A limit to the loads that trucks may transport over the State roads is also proposed. Among other proposed changes are heavier penalties and jail sentences in most cases for negligent drivers with especial severity to those who drive while intoxicated, and more stringent examination of applicants for licenses.

Delaware promises to straighten out some kinks in its automobile law. Some of the provisions include the requirement of a good brake and horn, or other signal device; State licenses for all drivers, except those operating ambulances and fire department vehicles; exempting from taxation as personal property any licensed motor vehicle; requiring the use of mirrors; requiring all vehicles other than motor vehicles to carry one white light at night, visible ahead and in the rear; and prohibiting any municipality passing or enforcing any law in conflict with the State automobile law.

—

New York Motor Truck Bill Passed by Assembly

ALBANY, N. Y., Jan. 31—The Hewitt-Evans bill imposing a graduating tax on motor trucks and buses was passed today by the Assembly, the Republicans voting in its favor by 81 to 34.

The bill will be sent to the governor for his signature to-day, so that the new tax may be levied to-morrow.

Yesterday the bill was passed in the Senate by a vote of 29 to 14, the action being taken after the most extended and heated debate of the 1917 session.

The authors of the bill claimed it would result in an increased revenue of $600,000. Motor truck interests opposed it as it was burdensome, because trucks are already taxed as personal property up to 2 per cent of their value. The increase totals in some cases up to 1400 per cent.

—

Connecticut Jitney Rule Illegal

HARTFORD, Jan. 27—Connecticut courts have declared the jitney ordinance of Norwalk unconstitutional and in conflict with the State motor vehicle law. These decisions are expected to affect the validity of jitney regulations in other Connecticut cities.

Scheidler, a Norwalk jitney driver and owner, refused to procure license for himself as operator or for his car as a jitney in addition to the State license, and was arrested. He was fined in the city court and appealed. Judge Scott in the criminal court of common pleas sustained the appeal on the ground that the Norwalk ordinance conflicted with the State and federal constitutions and with the State motor vehicle law. The case was carried to the supreme court and the appeal again sustained.

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Chicago Truck Owners Talk Fenders

CHICAGO, Jan. 30—Probably the most vigorous protest against Chicago's truck-fender ordinance will be lodged Thursday with the chief of police in answer to his call for a meeting of the truck owners of Chicago to determine how long it will be before they can equip their trucks with the fenders demanded by the present ordinance. It is expected that 300 representatives of the commercial vehicle users in the city will be present to show the impracticability of the fenders called for.

One Law for Pa. Drivers

All Operators To Be Examined —Driver's License Required —Dealer's Fees Increased

HARRISBURG, PA., Jan. 27—According to future amendments to the general automobile act of 1913 in this State, there will be but one law for automobile owners and every operator will take an examination and must have a driver's license.

No longer will cities make or enforce their own regulations or boroughs enact their own ordinances concerning the speed and conduct of automobiles on their streets. The Highway Department, which has brought these amendments before the Legislature now in session, proposes to wipe out all existing community legislation on the subject and to impose a uniform set of regulations.

By the new law the dealer's fees are increased from $10 to $15; the power of headlights fixed, and light is forbidden to rise above 42 in. from the surface on which the vehicle stands, the horn-blow sign provision is eliminated, and exceeding of 24 m.p.h. is to be prima facie evidence of recklessness.

No license will be valid under the new law until the driver's signature and photograph are attached.

One effect of the amendment will be the elimination of pull now exerted so effectively in behalf of owners who happen to be arrested. The new amendments provide that all information for offenses committed by automobile owners or users shall be brought under the act of Assembly, and not before a Magistrate or Justice of the Peace. They make a violation a misdemeanor, whereas in a great many cases at present drivers are merely called to answer to a charge of breach of police regulations or of a city ordinance.

—

$5,000 Bond for New York Owners?

ALBANY, N. Y., Jan. 26—All automobile owners, according to a bill, must accompany their applications for registration with a bond to be approved by the Secretary of State, in the sum of $5,000. This is to cover payment of any judgment recovered against the owner in the operation of his car, unless such owner shall state in his application that he is insured in an equal amount in an insurance company. The bill was introduced by Assemblyman Abner Greenberg of New York.

—

Dimond Takes Detroiter Representation

NEW YORK, Jan. 29—The Dimond Motor Car Co., this city, Apperson and Singer distributer, has taken on the Detroiter car.

55,000 1917 Cars for Maryland

Increase of 15,000 Expected in 1917 — Show a Success— Territory Very Prosperous

BALTIMORE, Jan. 27—Maryland will have 55,000 cars in 1917, an increase of 15,000 over 1916. This was brought out at the Baltimore show, which closed tonight at the Fifth Regiment Armory after a 5-day exhibition which was the most successful in point of attendance, sales and prospects developed of the eleven shows held here.

The Baltimore territory, which includes the State for some dealers and seven counties for the majority, the others being handled in the most instances out of Philadelphia and Washington, plans to use between 30 and 45 per cent more cars during the coming year than in 1916. The registration for 1916 shows 39,419 passenger cars, 4445 commercial vehicles and 1755 dealers. In 1915, there were 27,858 passenger cars, 3189 commercial vehicles and 1341 dealers.

This year for the first time the show was exclusively for passenger cars, and fifty-three dealers were represented, showing 221 cars. More than 30,000 visited the show, the big attendance day being 7000, which was Friday. The attendance increased about 15 per cent over last year despite the increase in the admission charge.

Bank Clearings High

A feature of show week was the holding of truck exhibitions throughout the city by the dealers and the use of a bus to send prospects to all of the show rooms where trucks were on display. The result of this show, commercial dealers say, will be the increase of about 40 per cent to 50 per cent more commercial vehicles in 1917.

Baltimore was never more prosperous than at this time. The bank clearings, according to the clearing house, for 1916 was $2,206,338,952, an increase over the preceding year of $372,689,955, the clearings for 1915 being $1,833,648,997.

Although the last government census showed Baltimore to have a population of 558,485, the city authorities now place the population at 595,000. Big corporations have established plants just outside of the city limits, and millions of dollars have been invested. Charles Schwab of Bethlehem Steel will spend $50,000,000 at Sparrows Point in improvements and general construction on the Maryland steel plant, which is now known as the Pen-Mary Steel Co. J. E. Aldred, the New York financier, is heavily interested in Baltimore and is responsible for the location here of the $8,000,000 aluminum reduction plant. The Prudential, a $5,000,000 oil company, has erected a $2,000,000 plant at Curtis Bay. The Standard Oil Co. is spending $1,000,000 for improvements. All of the railroad companies are expending millions in improving terminals and other shipping facilities. The net result of all of the big capital being invested has been to attract thousands of skilled workers and to improve the pay of many already here. This city is a ready automobile market. Backyard garages have sprung up all over the city and public garages have been increased by at least 10 per cent in number and more than 50 per cent in capacity.

Baltimore's business operations aggregate more than $1,000,000,000, with manufactures leading. Clothing alone showed $40,000,000. Copper, tin and sheet iron amount to $30,000,000, and slaughtering and meat packing $20,000,000. The jobbing trade of Baltimore, not including commission business, reached $300,000,000, dry goods, clothing, boots, shoes, hats notions and millinery being the chief items.

48,923 Farms in Maryland

There are 48,923 farms in Maryland. A compilation of the crops for the last year for the chief staples—corn, wheat, white potatoes, hay and tobacco—places the value above $80,000,000. Baltimore is to have a farm loan bank, and this will bring more farmers into the city than ever before.

More than a score of new automobile companies have come into existence in Baltimore during the past year. One of the most noteworthy features for the trade was the creation of a real Automobile Row along Mount Royal Avenue. Besides this, there have sprung up all over town new garages and accessory firms.

—

Mulford To Be with Hudson

DETROIT, Jan. 27—Despite many reports to the contrary, Ralph Mulford will be the star driver for the Hudson racing team this coming season. Mulford did consider the purchase of a Peugeot car and expected to race it himself, but has reconsidered and will continue with the Hudson company and will retain his berth on the engineering staff of that company.

—

Stutz Builds Sixteen-Valve Engine

NEW YORK, Jan. 29—In THE AUTOMOBILE for Jan. 4 it was stated that the sixteen-valve engine used in the Stutz car was a Wisconsin engine. This engine is entirely of Stutz design and is built at the factory of the Stutz Motor Car Co. in Indianapolis.

Plan Intercity Team Contests

New York, Chicago, Indianapolis and Detroit Delegates Outline Reliability Runs

CHICAGO, Jan. 29—Reliability contests in which teams from the major cities will compete probably will be instituted this summer as the result of a meeting held to-day at the Chicago Automobile Club, which was attended by representatives from automobile organizations of New York, Chicago, Indianapolis and Detroit, as well as by Chairman Kennerdall of the contest board of the American Automobile Assn. and Alfred Reeves, general manager of the National Automobile Chamber of Commerce.

The contests will be like the interclub contests originated by the Chicago Automobile Club, and which are semi-annual affairs between that organization and the Chicago Athletic Assn. For the intercity contest it is expected that each city will enter teams of from five to ten cars, penalties being assessed for lateness, etc.

According to present plans, the intercity run for this year will be a 3-day affair, starting from Buffalo early in August. A committee consisting of one representative from each city entering is to be appointed, with S. E. Hibben of Chicago as chairman. Representatives of the following cities have pledged teams, and their committee representatives are: Indianapolis, H. H. Rice; New York, C. G. Sinsabaugh; Detroit, W. S. Gilbreath; Buffalo, Dai Lewis. In addition, it is expected that Boston, St. Louis, Pittsburgh and Toledo will enter teams. Aside from those mentioned, representatives at the meeting included Ray Owen, W. E. Metzger and F. E. Moscovics.

—

N. A. A. A. J. Elects Faeth President

CHICAGO, Jan. 27—The National Assn. of Automobile Accessory Jobbers this week put the finishing touches on its organization. The association is but 18 months old, but whereas a mere dozen men attended the first meeting in the Florentine room of the Congress Hotel at that time, nearly 400 were present at this week's session.

Charles E. Faeth of the Motor and Machinists Supply Co., Kansas City, was elected president to succeed Sidney B. Dean, St. Paul, and it was voted to hold the next meeting in Hot Springs the first week in June. The last spring meeting was held there. The 1918 spring meeting will go to the Pacific Coast, probably to San Francisco.

The most important single thing that came up was the work of the jobbers in trade betterment. There is a big com-

mittee with a member from each State which is aiding the dealers and garagemen in forming local and State associations and in adopting better business and accounting methods and in becoming better tradesmen in many ways.

—

National Show Mgrs.' Assn. Formed

CHICAGO, Jan. 30—The National Automobile Show Managers' Assn. was organized here to-day by representatives of thirty-five dealer-associations from the Central West territory. E. E. Peake, secretary and treasurer of the Kansas City Motor Car Dealers' Assn. and manager of the Kansas City show, was elected president of the new association. B. J. Ruddle, assistant secretary of the Milwaukee Automobile Dealers, was elected vice-president and Ray W. Sherman, of *Motor World*, was elected secretary and treasurer.

—

Tampa May Have Speedway

TAMPA, FLA., Jan. 26—The local automobile owners are agitating the development of interest sufficient to enable the construction of a speedway on which to employ drivers during the winter months. Now that there are no more Ormond meets the reversion to automobile racing as a winter amusement along the coast is quite to be expected.

—

Bosch Contracts with 15 Companies

NEW YORK, Jan. 28—The Bosch Magneto Co., this city, has signed contracts with fifteen concerns in the automobile and commercial vehicle fields to use Bosch magnetos for the coming season. They are as follows:

Nelson & LeMoon	Chicago, Ill.
Maccar Truck Co.	Scranton, Pa.
F.I.A.T.	Poughkeepsie, N. Y.
Old Reliable Motor Truck Co.	Chicago, Ill.
Indiana Truck Co.	Marion, Ind.
Lange Motor Truck Co.	Pittsburgh, Pa.
Zeitler & Lamson Truck Co.	Chicago, Ill.
Federal Motor Truck Co.	Detroit, Mich.
Brennan Motor Mfg. Co.	Syracuse, N. Y.
Watson Wagon Co.	Canastota, N. Y.
Continental Truck Mfg. Co.	Superior, Wis.
Brockway Motor Truck Co.	Cortland, N. Y.
Eastern Motors, Inc.	Hartford, Conn.
Kent Motors Corp.	New York
Brinton Motor Truck Co.	Philadelphia, Pa.

May Revive Elgin Classic

—

Tentative Plans for Holding Road Races—To Be Championship Event

CHICAGO, Jan. 29—Tentative plans for the revival of the Elgin road race this year were made to-day at a meeting of Elgin representatives with representatives from the Chicago Automobile Club, the Chicago Speedways Assn. and Chairman Kennerdall of the contest board of the A. A. A. If the decision is made to hold the race this year it may be made a championship event.

—

Van Speedometer Equipment on Three More Cars

CHICAGO, Jan. 26—Van speedometers have been made stock equipment on the Wolverine of Toledo, New Era of Joliet, Ill., and the Pennsy, Pittsburgh, Pa. The Drummond, Hal 12, Jeffery, and Princess use Van Sicklen speedometers and stock equipment, in addition to the cars with this equipment in the specification tables of the issue of Jan. 4.

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Decoration Day Meet for Kansas City

KANSAS CITY, MO., Jan. 29—The Kansas City Speedway and Exposition Assn. will hold a meet on Decoration Day. It is now building a temporary grandstand.

—

Garford and Gramm-Bernstein Make New York Changes

NEW YORK, Jan. 29—The Garford Motor Truck Co., Lima, Ohio, has reorganized its eastern distribution system. Beginning to-day the local office became a factory branch, under the management of Rodney Hallam. Brooklyn, Newark, eastern New York, northern New Jersey and New England sales will also be handled from the local office. C. B. Harvey returns from Philadelphia to take charge of the sales organization.

The R. E. Taylor Corp., formerly handling the Garford trucks in this territory, is now distributor for the Gramm-Bernstein trucks in the East. The company will control sales on the Atlantic coast from Maine to Maryland.

—

N. E. Smith Form-A-Truck Holds Convention

BOSTON, MASS., Jan. 27—One of the events of the week here was the convention of the New England Smith Form-A-Truck dealers called by John L. Judd, the New England distributor. He had as guests from the factory E. M. Elliott, general eastern sales manager, and J. D. Davis of the Commerce Trust Company of Chicago. After 2 days of conferences there was a banquet at the Westminster at which Mr. Judd presided and more than 100 were present.

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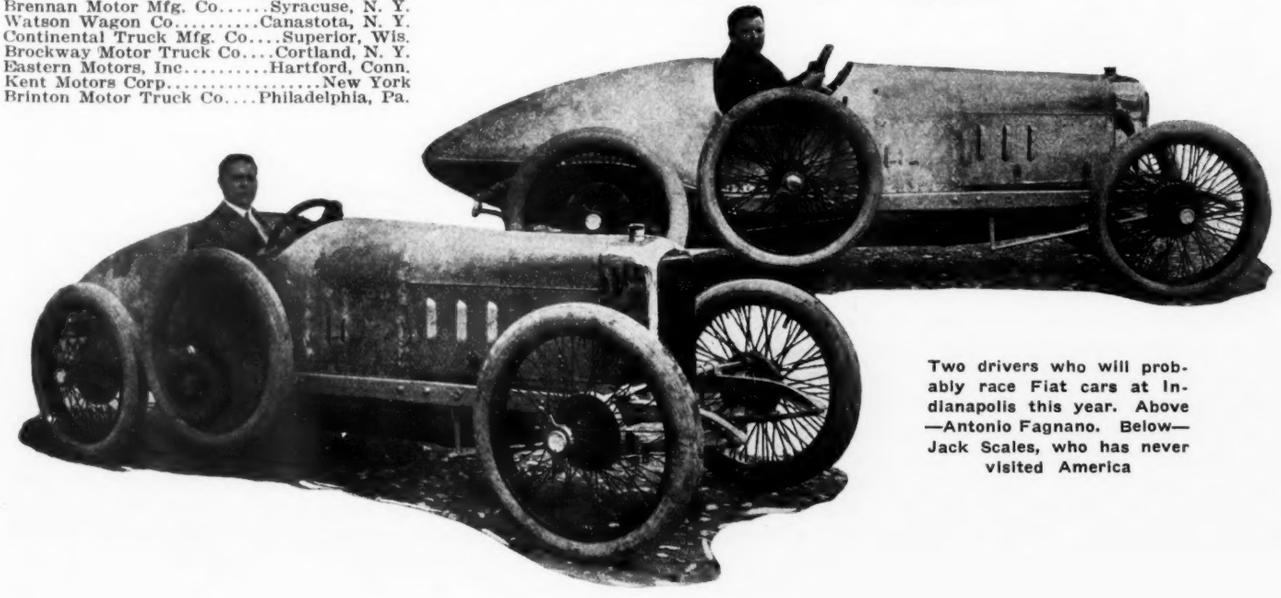
New Offices for Silvex

SOUTH BETHLEHEM, PA., Jan. 27—The Silvex Co., manufacturer of Bethlehem spark plugs, is preparing to remove its sales organization, advertising department and general office forces away from the factory and into a separate office building at South Bethlehem.

—

Resta Receives Bosch Trophy

CHICAGO, Feb. 1—Presentation of the Bosch trophy and cash prizes for 1916 was made at the Chicago Automobile Club to-day. Resta took first place with 4100 points. The other winners were Aiken, with 3440 points, and Rickenbacher, with 2910. The prizes for 1916, which are offered again this year, are a $1,000 silver cup and $1,000 cash for first place, $1,000 to second place and $500 to third place.



Two drivers who will probably race Fiat cars at Indianapolis this year. Above—Antonio Fagnano. Below—Jack Scales, who has never visited America

The Automobile

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Spreading Output

IN times like these when the question of disposing of cars is not generally one which is any worry to the factory sales manager, the question of distribution assumes a new angle.

Occasionally it is the custom of distributors to arrange for a percentage of the factory output regardless of the exact number produced. Where the output is small it is not desirable to carelessly make contracts of a limiting nature such as this. The manufacturer must look ahead to times that will not be as prosperous as these and instead of concentrating his output on a single locality, he should aim to spread it over the most advisable area.

The question of selecting more dealers is not so pertinent now as that of selecting better ones. At the Chicago show there is a direct reflection of this: Instead of seeing all the manufacturers anxious to sign up new dealers and new territories it is more a question of getting better dealers and better territories.

Manufacturers of popular-priced cars whose output is still limited to modest figures are avoiding the concentration of a large part of this output in a single territory. On the other hand, there must not be too wide a spread or the proper service will not be given. It takes a certain number of cars in a given territory to support a service station. The number sold, therefore, should at least exceed this minimum figure. If it is the plan to nationalize the product and to open for the future the widest field of endeavor, however, the manufacturer must see that he does not darken the map with one or two black spots representing his sales area, but rather that as many desirable fields as possible with his put are covered.

Presidents in Foreign Trade

WHETHER or not the United States is to be a great exporting nation and build up a world commerce was a subject that 1250 delegates at the convention of the National Foreign Trade Council last week could not settle; but it was apparent from all sides that nearly all of these 1250 delegates were much interested in foreign trade. There were a few other things quite apparent at the convention: One was that the automobile industry was hopelessly poorly represented by managers of concerns, presidents and others who should be deeply interested in the national aspect of the export problems. Their export managers were present, but the head officials should have been present. The head officials in many other industries were present in goodly numbers. Those in the automobile industry were conspicuous by their absence.

The convention proved that we are badly in need of certain national reforms before export trade will be as easy for us as it is for some other countries. All European countries have discovered how essential it is to co-operate nationally in export trade. We yet have to learn this lesson. The present Webb bill, now before the Senate committee, has been pushed to its present position with the hope of legalizing co-operation among our manufacturers in export trade—to free them from the restrictions of the Sherman law.

The Webb bill requires pushing along; it should be passed by the Senate this year. The President favors it. Whatever pushing it gets should come from the head officials of our automobile companies and not from our export managers.

For export trade we need a few more ships than we have at present. The convention told how our Pacific Ocean trade has dwindled to a hopeless phantom while Japan's has risen to enormous proportions. We were told how our government hampers our American shipping by various laws, costly crews and in other ways. This is information for our presidents rather than export managers.

Another political feature of foreign trade is our present tariff. The convention voted that we must have tariff changes. We must have a bargaining tariff which we can raise or lower to meet the measures adopted by foreign countries. At present we can lower our tariff schedules but cannot raise them. This is a serious handicap in these days when our automobiles are being barred from several countries and when we can expect any day to find trade barriers built higher and higher by foreign governments. To get a bargaining tariff we have to work politics, which is not what our export managers are hired for. That is work for our presidents, our secretaries, our directors and stockholders.

Chicago

World's Greatest Distributing Show

By David Beecroft

92 Car Exhibitors, Compared with 80 Last Year, Indicate Industry's Growth.

324 Cars and Chassis, or 30 More Than Exhibited at Chicago in 1916.

Four New Cars in Coliseum and Armory—Stephens, Hassler, Chicago Six and Classic.

A New Racing Car, the Disbrow, at the Salon. Fageol Also Shown.

Only Four Electric Makes on Display—Woods Dual Power in Gasoline Car Class.

Custom-Made Bodies Show Increasing Popularity in Many Western Cities.

Accessory Exhibits Representative Though Handicapped by Lack of Adequate Space.

Show Brings Out Distributors' Problems in Storing Cars Over Winter.

CHICAGO, Jan. 27—The seventeenth annual automobile show which opened this afternoon in the Coliseum and armory, has by its big attendance and good exhibits demonstrated once more that the industry is not halting because of war or rumors of peace. The same buoyant and optimistic atmosphere which has pervaded the Chicago shows for years is here to-day and, although opening day is largely paper day, the crowd tonight was up to that of any previous year in buying caliber. The wealthy people have not been in the show to-day—they never are on the opening day—but dealers are all looking for a greater turn-out of them than last year.

It is not expected that the show will mean very heavy retail sales—it never does—but more money is being expended in advertising by the exhibitors than formerly and the city is already full of out-of-town people. Automobile show week is the biggest week of the year with Chicago theaters and hotels and this year will be a little more so than formerly. It is the greatest automobile advertising week of the year for the industry.

Sam Miles always gives a good show from the decorative viewpoint and this year is no exception. The scheme follows more or less generally that of former years, but the colors are a little darker and the effect correspondingly richer. Red and browns predominate. The scheme is that of an old English castle. The object is to give illumined art glass effect. There are two rows of pillars in the Coliseum, each bearing a huge globe of canvas so made and lighted as to give the effect of many-colored glass. The ceiling has many large panels also illumined as to give the glass effect. Finally the shades over the electric lights are art glass imitations.

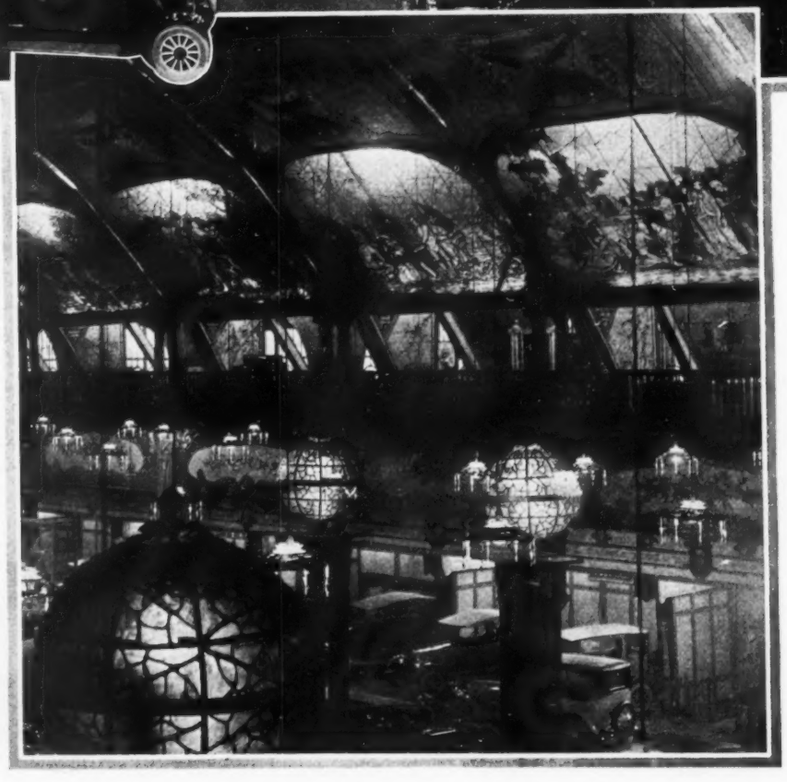
Bigger Than 1916 Show

Numerically the show is a little bigger than last year, as there are ninety-two car exhibitors as compared with eighty last year; and there is a total of 324 cars and chassis as compared with 294 a year ago. The cars occupy practically the same parts of the various buildings as formerly and the exhibit of show cars is much the same as seen in New York. There are very few different show cars here, a few examples being where local dealers have specially finished jobs, the sale of which has increased very much in Chicago during the past year.

Ten years ago the Chicago show was generally quite a different one from New York. Then there were a dozen or more makes not seen in the East. Year by year has seen the number of new cars here reduced until this year there are not more than three or four cars not seen at the Grand Central Palace. The new cars here are the Stephens, Hassler, Chicago six and Classic. To this might be added two new jobs at the Salon which is being held in the Congress hotel, where the luxurious Fageol and the new Disbrow racing job are shown.

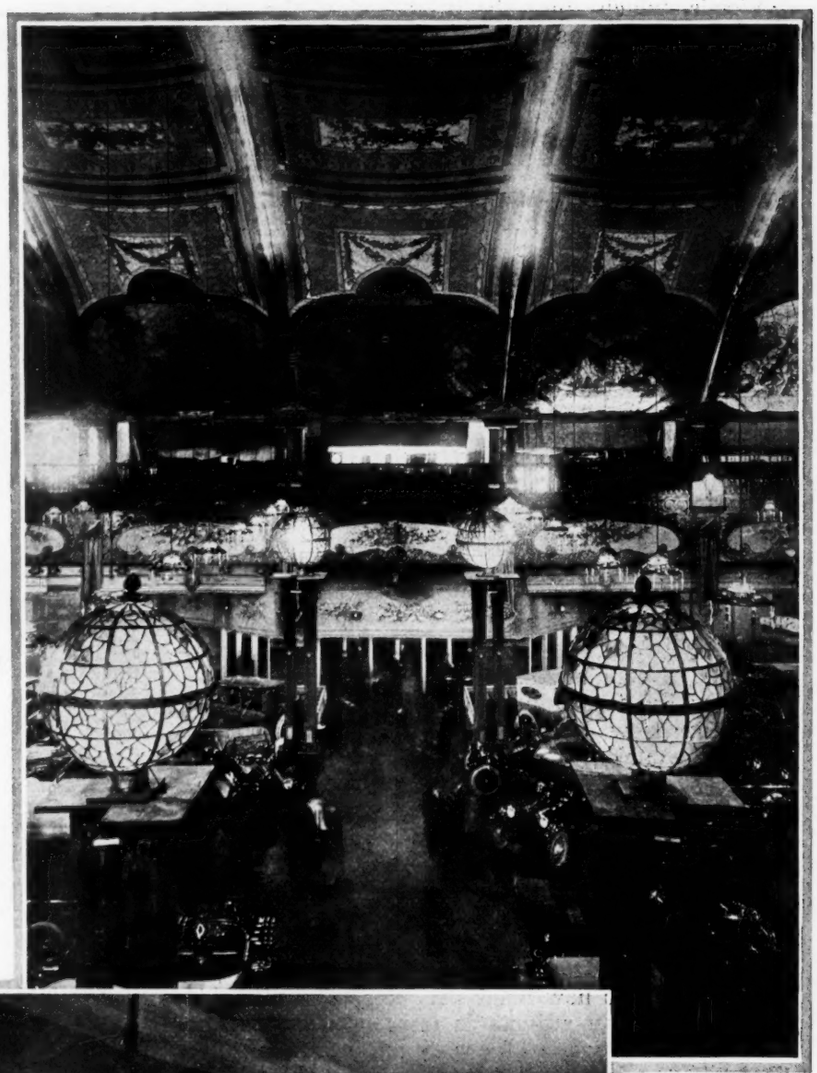
Chicago has long held a premier position as having the leading display of electrics, the exhibitors numbering many more than seen in New York. In this respect conditions are changing and what is known as Electric Row along both sides of the center aisle of the armory has lost much of its exclusiveness. The aisle has been invaded by gasoline makers, who have taken the place of electrics that have dropped out and this year there are only four electric makes shown, Detroit, Ohio, Milburn and Baker-R & L.

Above—Coliseum from the north balcony. Note the art glass panels along the sides and detail of ceiling done in brown and fawn tapestry effect. The immense pillars are a dark brown shade surmounted by huge globes

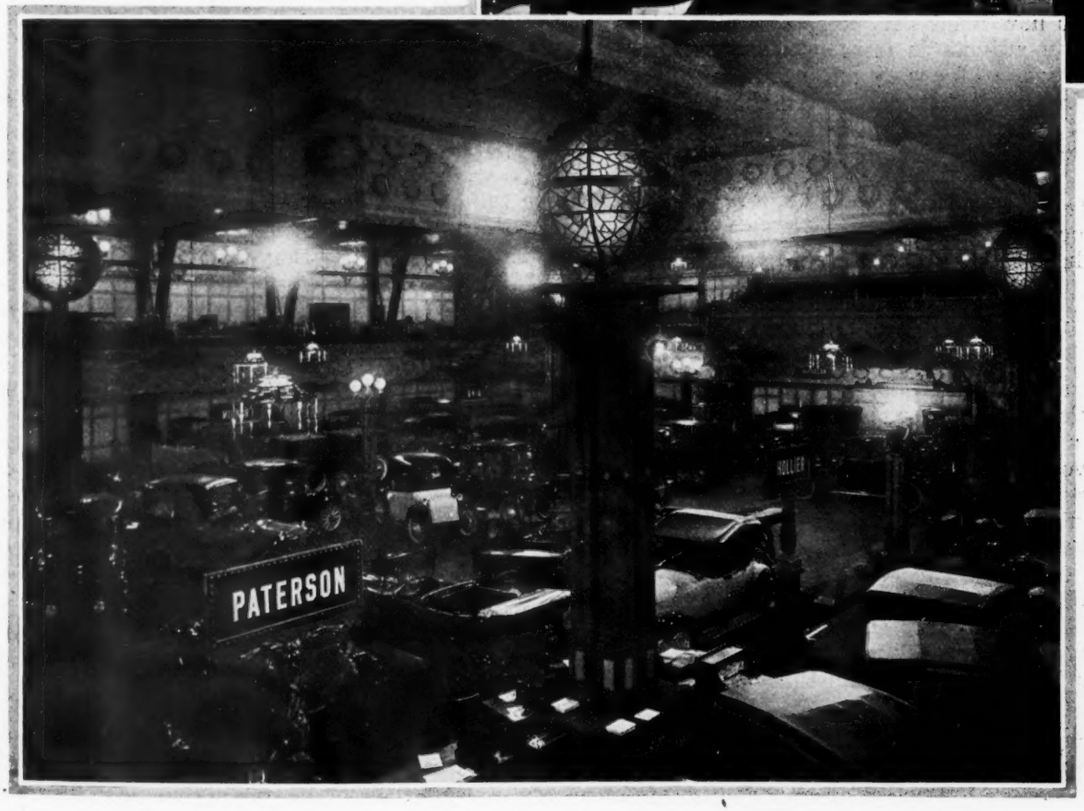


Coliseum taken from midway west balcony, showing detail of art glass panels and globes. The globes are bronze and light brown, and harmonize effectively with the ceiling and pillar color schemes

Old English Castle Is Chicago Show Setting



Entrance to Coliseum from east balcony of main room showing broad central aisle. Note the impressive effect gained by providing a wide passage way and the pleasing arrangement of exhibits on either side



View of Armory taken from northeast balcony. The general scheme of decoration is in accord with that in the Coliseum with tall pillars surmounted by globes. Electric cars are being shown in this building

Woods, which since the inception of the automobile industry has been an exhibitor in the electric field, is still on Electric Row, but with its new gasoline-electric car, which does not fall in the electric classification. It is an interesting coincidence that the Woods chassis exhibited for the first time occupies the identical exhibit space in the armory which the Knight sleeve-valve chassis occupied many years ago when it was first exhibited at an automobile show. The Knight job has made its progress and it will be interesting to follow the development of the gasoline-electric movement during the next few years.

Accessory Displays Scattered

The Chicago show is never as strong in accessories as New York, although it should be a greater one. Here the accessories are scattered in places where cars cannot be placed. You find them forming a ring around the four sides of the Coliseum gallery, the second floor of the Coliseum annex is filled with them, there are a few in the basement of the Coliseum annex and the remainder are strung around the narrow four sides of the gallery in the armory. It is unfortunate that Chicago has not such a compact method of displaying accessories as the two upper floors of Grand Central Palace in New York afford. Had Chicago the space, it would stage the greatest accessory show in the country. There is more buying at Chicago than at New York; there are more dealers present and the accessory business is handicapped by a lack of space.

There are not many new accessories, here again the Chicago show not displaying that array of accessories not previously seen that it boasted of in former years.

There are two new Solar products, a windshield spotlight with an adjustable mirror, a switch on the lamp and universal focusing and adjusting devices. There is also the Duplex headlight which gives a city and country lamp in one. The Jackson electric valve grinder is new, as is also the new Kemco Ford starter and some of the Halladay handy products such as a suitcase and package carrier. The new accessories are confined beyond these to little handy devices that would hardly be furnished as regular equipment on cars but are important for the owner.

Makers Neglect Chicago Show

The Chicago show is not taken advantage of by many automobile manufacturers as thoroughly as it should. The makers concentrate more on New York and leave Chicago to the sales managers, the advertising managers and the dealers. Two big shows in a month are too much for many makers. This is to be regretted because there is a general feeling among the large Chicago distributors and in such other big distributing centers as Minneapolis, Kansas City, St. Louis, Omaha, Denver and the Pacific coast cities that the makers do not keep close enough to the distributors and through them with the buying public.

A general canvass of the Chicago distributors brought forth this conclusion to-night. Like distributors in other centers mentioned there are many ways in which makers and distributors should be closer together and the Chicago show offers a good opportunity for this. From A to Z there has been a shortage of closed cars during the past 6 months and Chicago distributors have concluded that often the makers have not adequately gaged the increasing demand for closed types.

Production has so engrossed the maker for nearly 2 years that he has only had eyes for standard types of open jobs. Closed jobs have gummed the factory machinery a little too much.

To-day the distributor has a legitimate right to be heard on this question: There are two sides to it, the maker and the distributor, and while the maker worships production of an open model the distributor wishes otherwise. The distributor cannot sell the open car throughout the country territory in the winter months beginning Dec. 1, and running, perhaps, to March 15. In the Illinois territory, and the same applies to many other territories, the roads are generally too bad in these months. The agents cannot sell cars and the distributors generally agree with them. This means a very general stopping of the movement of open cars in these months which necessitates the Chicago distributor storing cars in large numbers for quick delivery around April 1. Distributors agree in that it is very difficult for them to get country agents to store cars; a few say they can average one car per dealer, but generally the country and small-town banker has not taken keenly enough to the question of financing the local dealer. The dealer has not enough money to pay outright for two, three or four cars. He has hesitated to go to his banker, and as a result the distributor has had to carry the load.

Distributors' Heavy Storage Expense

And it is no small load that these Chicago distributors have to carry by way of winter storage. Some distributors are storing 300, others 400, a few 500 and there are rumors that some are storing nearly 750 cars. This storing costs money and the distributor has to carry the entire expense. Several distributors agree that it takes between $35 and $45, average, to carry a stored car worth $1,500 for 3 months. Storage last year was $2 per car and now it is $2.50 per car per month. Besides storage there is interest on the money advanced by the banker, and there is also insurance, as well as the many expenses connected with placing cars in storage, taking them out, and other incidentals.

Chicago distributors are emphatic in their conviction that the maker should give some assistance in carrying this storage load. They suggest some fifty-fifty division. The maker, they believe, should give an additional discount of perhaps $20 to $25 per car for all open types delivered in December, January and February and perhaps part of March. This problem has not been put up to the makers in a united manner, but it will be surprising if another season does not see some compromise of this nature advanced.

The distributors take these winter cars and store them as an accommodation to the maker, and it is a real accommodation, chiefly as he gets his draft against bill of lading. It is this co-operation of distributors that has made this winter delivery possible, and the maker has not carried a single bit of the load. It has all been shouldered on the distributor.

Develop Closed Car Market

So far as city trade is concerned the dealer does not object so seriously, but with rural trade in the Chicago territory there is an almost complete cessation in the winter season as mentioned. With the retail city trade sales are being spread over the 12 months much more uniformly. The dead Novembers, Decembers and Januarys of a few years ago are now wanting, and while these months cannot be compared with spring months they retain the sales forces. This has been largely due to the heavier sale of closed cars, which as yet has not invaded the country. In the Chicago zone the closed car is gaining in such cities as Springfield, Ill., but as yet has been little taken up in such cities as Rockford, Decatur, Peoria, Bloomington, Ottawa, Streator, Danville and La Salle, to which might be added other centers like Elgin, Aurora, etc.

Still another handicap the distributors are generally complaining of is that the makers do not give them all of the cars they are contracted for in August and September, but deliver some of these in November, December and often in January. This requires that the distributor spend $35 or $45 on each, carrying them over for spring delivery. So far the maker has not offered to even pay winter carrying charges, which it would seem is his legitimate obligation.

Reverting to the closed car business; it will bear repeating that Chicago distributors generally agree that manufacturers have not adequately awakened to the possibility of the closed car. There has been a most general increase in this field. One distributor has placed 250 convertible winter jobs in this city this season, whereas formerly he never placed 100. This distributor got good shipments because his factory was not able to give eastern cities their quota owing to railroad shipments and difficulty of getting railroad cars into the Atlantic seaboard territory.

Distributors are strong in their stand that if the maker were to keep closely in touch with them, and consult them more on matters of car demand, there would be more recognition given to the closed car market. This market appeals to the dealer who has to pay the same rent in December and January that he has to pay in June. In the winter months his lighting bills are heavier and other expenses increase. To meet these obligations he wants to sell cars every month in the 12. He sees in the closed car field possibilities which will make it possible to deliver as many closed cars in the fall and winter months as open cars in the medium late summer months. It only requires due recognition of this on the part of the maker, and arranging his manufacturing program of closed cars to give them when the distributor wants them.

Another developing tendency of the automobile market as observed in the Chicago territory for the past 2 years is that of giving buyers wider color options, but placing a price on the extra work. Overland and Cadillac were leaders in this movement a year ago and within the last year several other big distributors have fallen in line. The Hudson distributor has added a paint and finish department and is already flooded with work. Other distributors, instead of adding their own departments, have the work done by contract.

There is one example in the show of the small Oakland which has nearly $600 added to its stock price by way of special color, six wire wheels, two extra tires, a smart victoria hood, special slip covers, and a few other luxuries.

Manufacturers will find it to their advantage to investigate very generally what has been done and what is being done in this field. It portends a demand for more color and while makers will want to limit standard prices to the sombre black, solely for production, it may be that a few makers taking up this color subject will get the jump on a certain field of sales.

Get Into Stone Road Movement

It will be a good investment to the American automobile makers to get more actively into the stone road movement for central and southern Illinois and in some other wealthy sections of the great agricultural zones of the Mississippi valley. It is deplorable that central Illinois with farm property worth as high as $250 per acre and in some cases higher, should have roads that cannot be used for three and in some cases four months of the year. Stone roads would have an astonishingly stimulating influence on winter sales in Illinois. Here is a place where makers and distributors should work hand-in-hand, and it may be where the work should be well backed by the manufacturer, but all work on the firing line should be done by the distributors who could marshal their subagents for such work. It is just as essential to get stone roads in central Illinois to stimulate winter sales as it is to have full-page display advertisements during show week. Good roads may not appeal so spectacularly, but they are no less potent.

STATISTICS OF CAR AND CHASSIS EXHIBITS AT CHICAGO SHOW

EXHIBITS

	1916	1917
Car manufacturers	80	92
Total number cars and chassis	294	324
Stripped chassis	52	50
Four-cylinder	106	101
Six-cylinder	135	164
Eight-cylinder	42	41
Twelve-cylinder	11	18
Total	294	324

BODY TYPES—OPEN CARS

	1916	1917
Five-passenger	64	75
Six and seven-passenger	57	54
Two-passenger	33	21
Three-passenger	23	9
Four-passenger	10	47
Total	187	206

BODY TYPES—CLOSED CARS

	1916	1917
Coupe	7	14
Sedan	10	26
Demountable top	18	9
Cabriolet	2	0
Limousine	10	12
Landaulet	1	0
Town Car	5	1
Berline	2	1
Total	55	68

Four New Cars Appear at Chicago

Stephens, Hassler, Chicago and Classic Are Entirely New Chassis—Cars Not Shown at New York Include Glide, Maibohm, Monitor, Dixie and Woods Dual Power

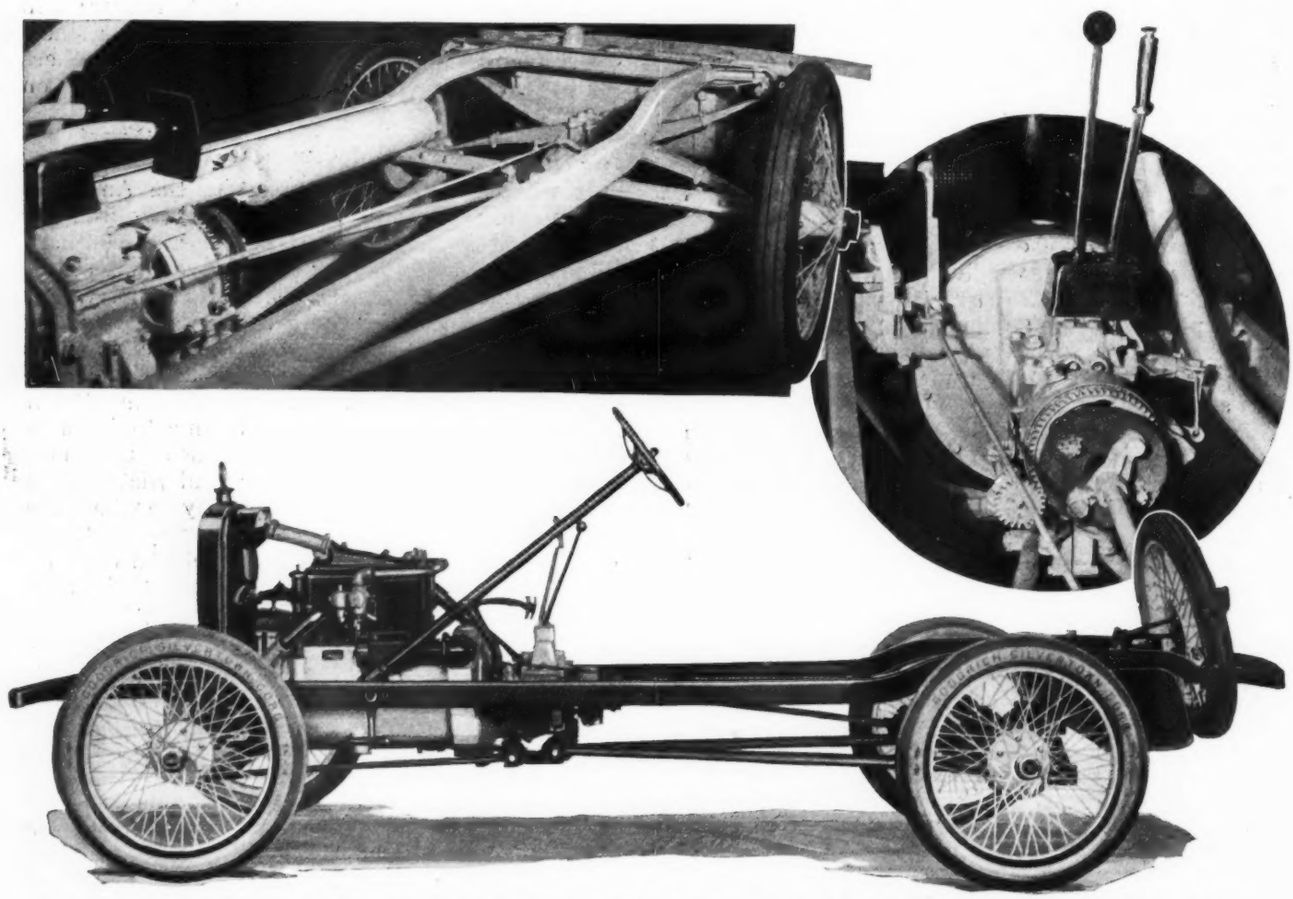
FOUR new cars are making their first appearance at the Chicago show. None of these represent anything radical, all being assembled from standard units and of conventional design. The four are the Stephens, which is made by the Stephens Motor Branch of the Moline Plow Co., a concern long established in the plow and wagon business; the Hassler, made by the Hassler Motor Co. of Indianapolis; the Chicago light six made by the Pan-American Motors Corp. of Chicago, and the Classic, made by the Classic Motor Car Corp., Chicago.

As usual there are a number of cars which were not at New York, the Glide, Maibohm, Monitor, Woods Dual Power, and Dixie are all examples of this. On the other hand some of the New York cars are not at Chicago, but none of the larger manufacturers are missing.

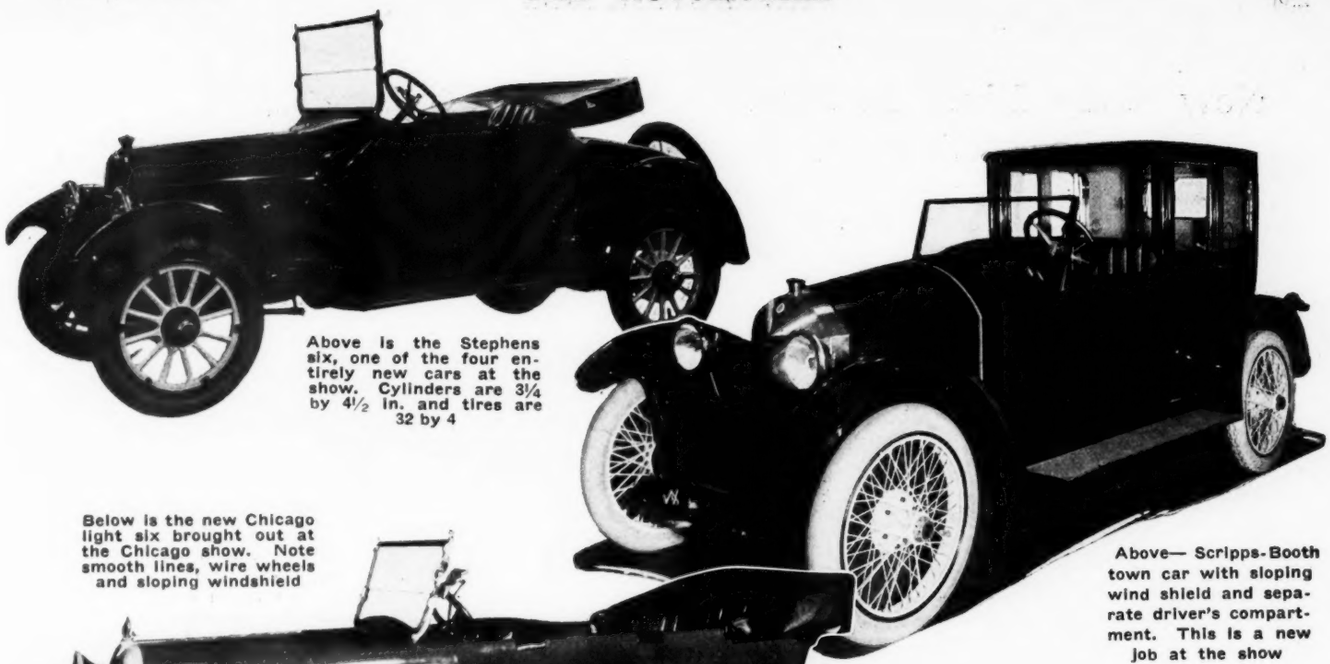
In new bodies there is not so great a variety as has been seen in previous years. Almost without exception the exhibits which were at New York were moved bodily to the Chicago show. Scripps-Booth has a new town car on exhibition for the first time and the Anderson electric also shows a new body. The Ohio electric has an entirely new model at the Armory, which is a modification of the previous design, without any mechanical changes.

One of the most interesting of the new exhibits is the Stephens six, known as the model 65. It is attracting considerable attention on account of its newness and the fact that it is made by a department of a long-established concern. It represents up-to-date practice in assembled car design incorporating a Continental power plant, Zenith carbureter, Connecticut ignition, Willard battery, Gemmer steering gear, Auto-Lite lighting and starting, and other standard parts. It is made up also in a roadster which is known as model 60.

The Continental engine employed is the standard light six job of 3¼ by 4½ in. Cylinders are block-cast and carry a unit power plant on a standard bell housing. The clutch is a multiple disk automatically oiled from the motor lubrication and hence requiring no attention on the part of the



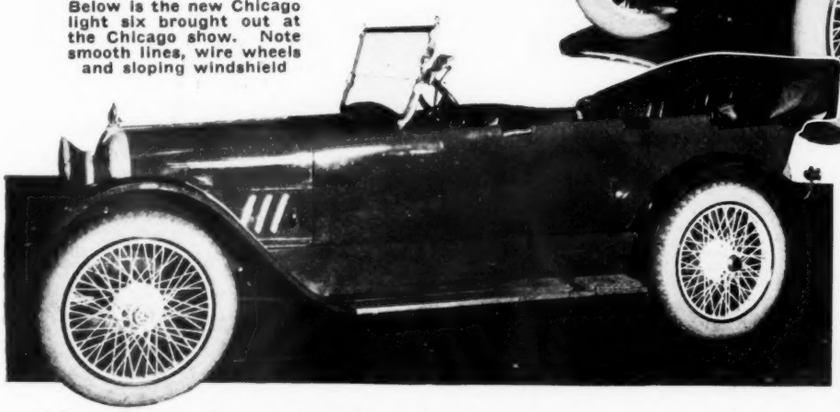
Details of the new Hassler chassis. Above is a view showing the flexible drive with two Thermoid couplings and the rear cross-spring mounting. At the right is the rear of the power plant, showing the transmission brake and the forward Thermoid coupling. Below these is the side view, showing the radius rods



Above is the Stephens six, one of the four entirely new cars at the show. Cylinders are 3¼ by 4½ in. and tires are 32 by 4

Above— Scripps-Booth town car with sloping wind shield and separate driver's compartment. This is a new job at the show

Below is the new Chicago light six brought out at the Chicago show. Note smooth lines, wire wheels and sloping windshield

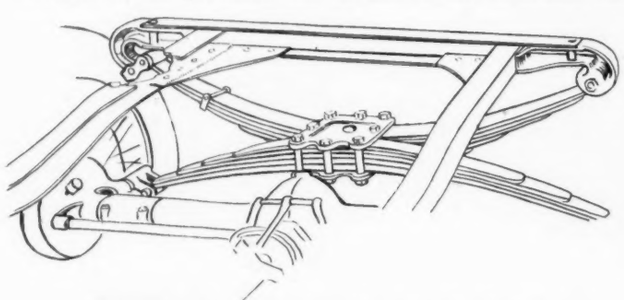


driver. The gearbox furnishes three speeds and the drive is taken through a propeller shaft with two universals to a floating rear axle. Both the drive and torque are taken through the rear springs in Hotchkiss style and the springs, in accordance with growing practice, are mounted directly beneath the side members of the frame. The wheelbase is 115 in. and the tires 32 by 4, quick detachable with plain tread in front and the all-weather non-skid in the rear.

In the matter of equipment, the car is complete at the sales price of $1,150 f.o.b. Freeport, Ill. The 19-gal. gasoline tank is swung under the side frame members at the back end of the chassis and the feed is taken by Stewart vacuum. There is also a Stewart-Warner speedometer and a Stewart engine-driven tire pump equipped with a pressure gage on the hose furnished as standard equipment, and there also is included an extra demountable rim, trouble lamp, and the usual jack, tools and repair kit.

Hassler Incorporates Floating Drive

The Hassler is manufactured to a large extent by the same interests which produced the Hassler shock absorbers for Ford cars. It has been developed to a large extent by Charles Merz, a well-known racing driver who has been acting as experimental engineer. While it is an assembled car, it incorporates some unique features. Probably the point of note is in the floating drive. This is made up by two double Thermoid-Hardy disk couplings which are placed at each end of the propeller shaft. Also, in the drive assembly, there are two radius bars which extend from the rear end of the gearbox to points at the extremities of the rear axle housing. In some respects this resembles the Hotchkiss drive, with the addition of the radius members, which are designed to take the horizontal road shocks instead of allowing them to be transmitted through the spring eyes and shackles.



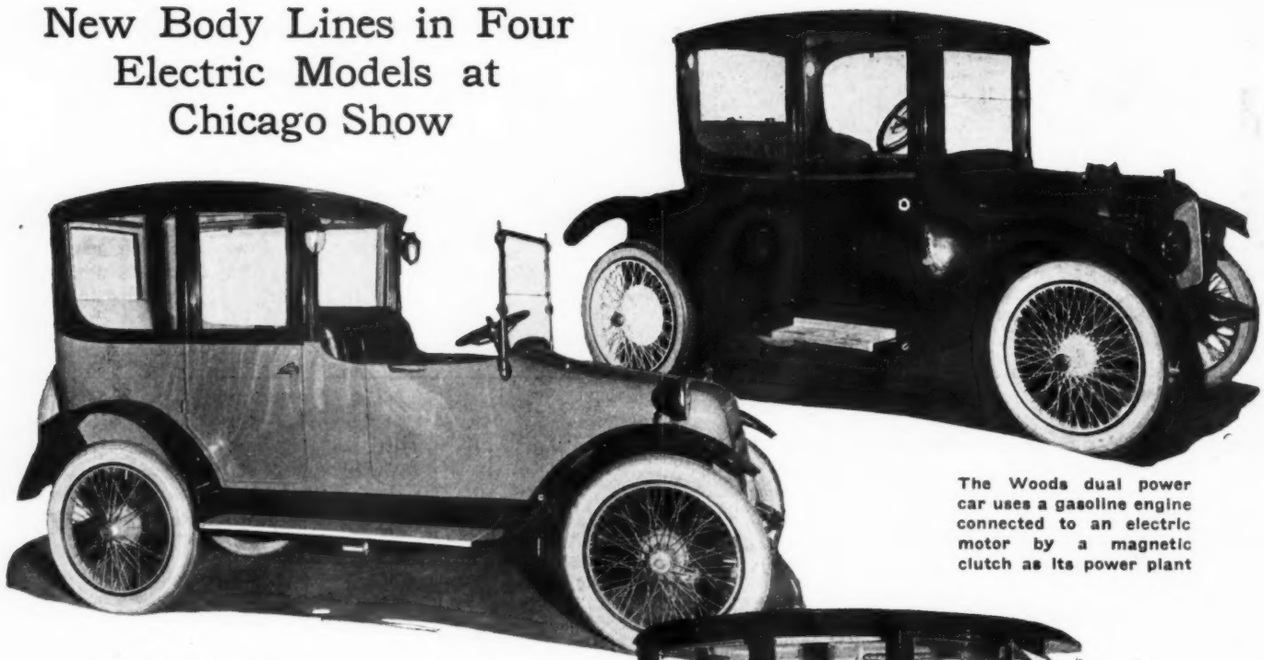
Transverse X-type rear springs on the Hassler

Heavy volute springs are housed in casings on the under side of the gearbox. Through the inner coils of these springs the radius rod ends are bolted, allowing for a free movement of the rear axle within the limits of the action of these springs.

The standard units of which the car is made up include a Buda four-cylinder L-head block standard engine of 3¾ by 5⅛ claimed to develop 40 hp. at 1950 r.p.m. It is the standard Buda product with full aluminum crankcase and helical gear camshaft drive. The carbureter is a Rayfield 1¼ in., ignition by the Connecticut system, with magneto type of distributer, starting and lighting by Auto-Lite in connection with a Willard 6-volt 100-amp.hr. storage battery. The clutch is a Borg & Beck dry-plate design transmitting the drive to a Grant-Lees gearbox mounted in a semi-steel case and equipped with S. K. F. self-aligning double row ball bearings on both the main and lay shafts. The shafts and gears are both of nickel-steel. The drive, as explained, is through the flexible coupling and then to a floating axle which is mounted on Hyatt roller and New Departure bearings. The driving members are chrome vanadium steel and the gears a product of the Brown-Lipe-Chapin organization. The latter are of nickel-steel and provide a direct drive ratio in the rear axle of 3.7 to 1. The springs are transverse X type in the rear.

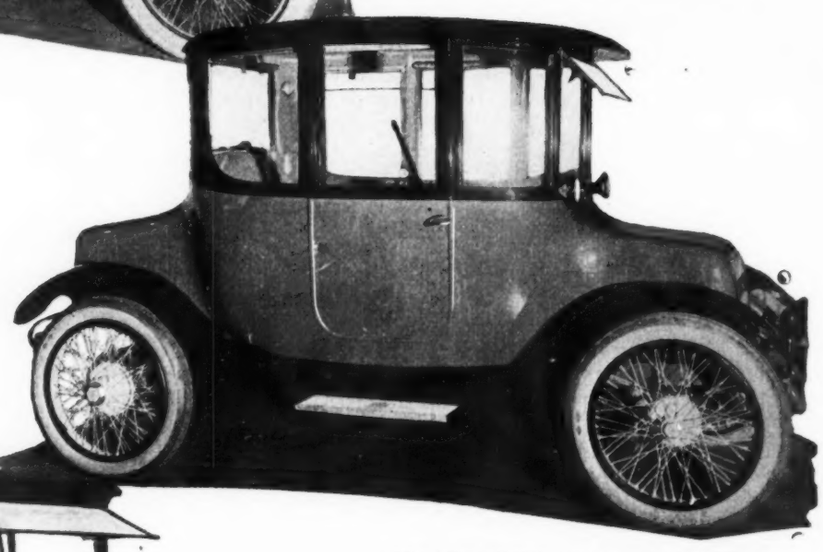
Gasoline feed is by the Stewart-Warner vacuum system

New Body Lines in Four Electric Models at Chicago Show

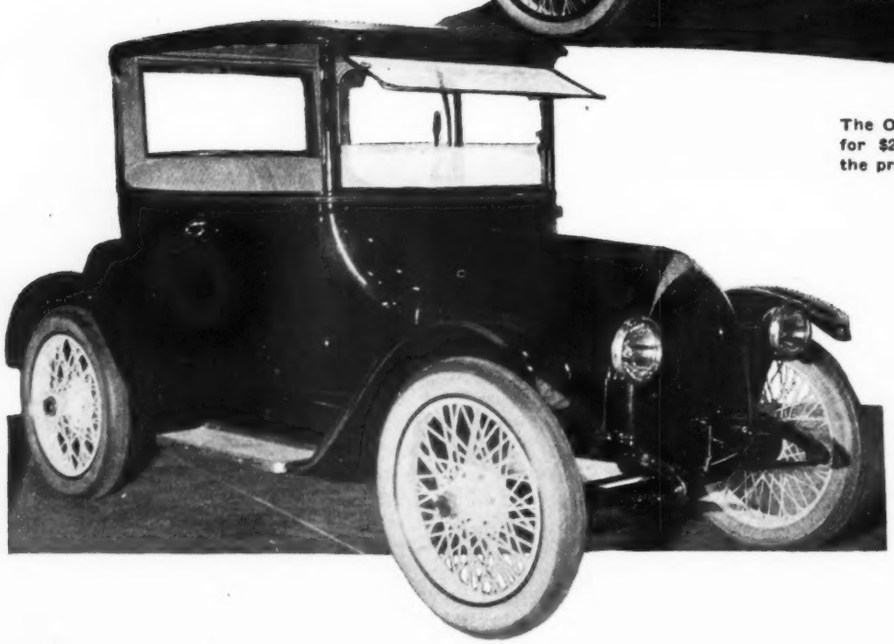


The Woods dual power car uses a gasoline engine connected to an electric motor by a magnetic clutch as its power plant

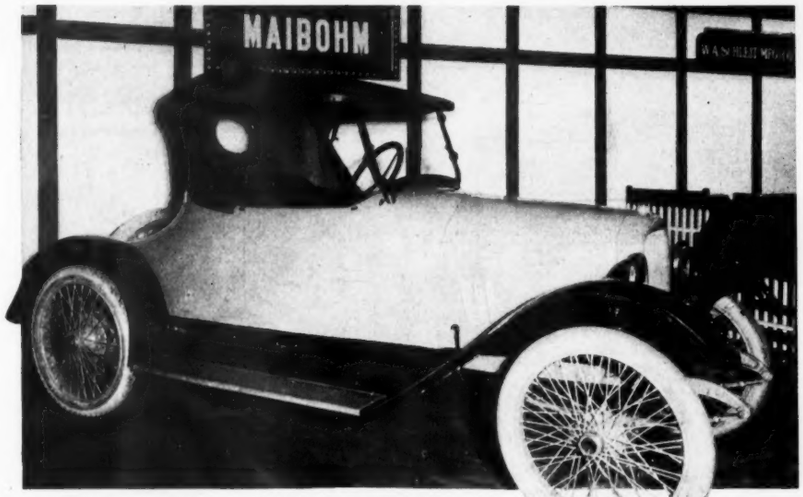
The design of the Milburn taxi shows that the difference in body types of the gasoline and electric cars is rapidly being eliminated. The close resemblance of this body to that of a gasoline car attracted considerable attention



The Ohio electric coupe model 44 sells for $2,380, a reduction of $520 from the price of the previous model, which it closely resembles



This Springfield body on the Detroit electric, adapting the convertible principle to the brougham style, has a rounded front hood similar to the latest type of gasoline car front ends



Maibohm roadster, exhibited at Chicago but not at New York

and Houk wire wheels provided with Silvertown cord 33 by 4 in. straight-side tires are standard equipment. The wheelbase is 112 in. and the road clearance is 10 in.

At present a roadster only is mounted on this chassis. It is a roomy style for two passengers with a seat width of 45 in. and a passenger seat mounted slightly behind that of the driver. The body measures 66 in. from the back of the seat to the dash, 32 in. from the front of the seat to the dash and the doors are 24 in. wide. The car is completely equipped with bumpers as standard and a Boyce Motor-Meter and five wire wheels with cord tires included in the purchase price, which is $1,650 f.o.b. Indianapolis.

Chicago Uses Double Drop Frame

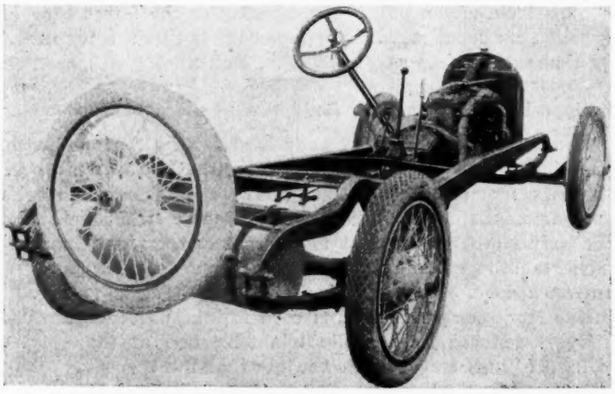
The Chicago light six is fitted with standard parts throughout, assembled in a frame of original design. The power plant is the 40-hp. 3⅛ by 5 in. six-cylinder Rutenber fitted with a Rayfield carbureter. The gearbox and clutch are a unit with the crankcase, making it a unit power plant, the clutch being a multiple-disk dry-plate type transmitting the drive to a Warner selective three-speed gearbox. The drive is flexible, with both propulsion and torsion taken through the rear springs. The latter are mounted directly beneath the main frame member so that in transmitting the drive there is no twisting stress on the frame. The latter has a double kick-up in the rear, giving the car an extremely low center of gravity and bringing the body quite close to the ground.

The chassis construction is simple, with the frame wide at the rear, tapering at the center and parallel and narrow at the front. This permits the two supporting points at the rear of the power plant to be mounted directly on the main frame while providing a wide body mounting at the rear. The rear springs are 57 in. long, semi-elliptic, 2 in. wide. They are underslung, which also has a tendency toward lowering the center of gravity of the car. The axles are Timken. Wheelbase is 120 in. and the tire size 32 by 4.

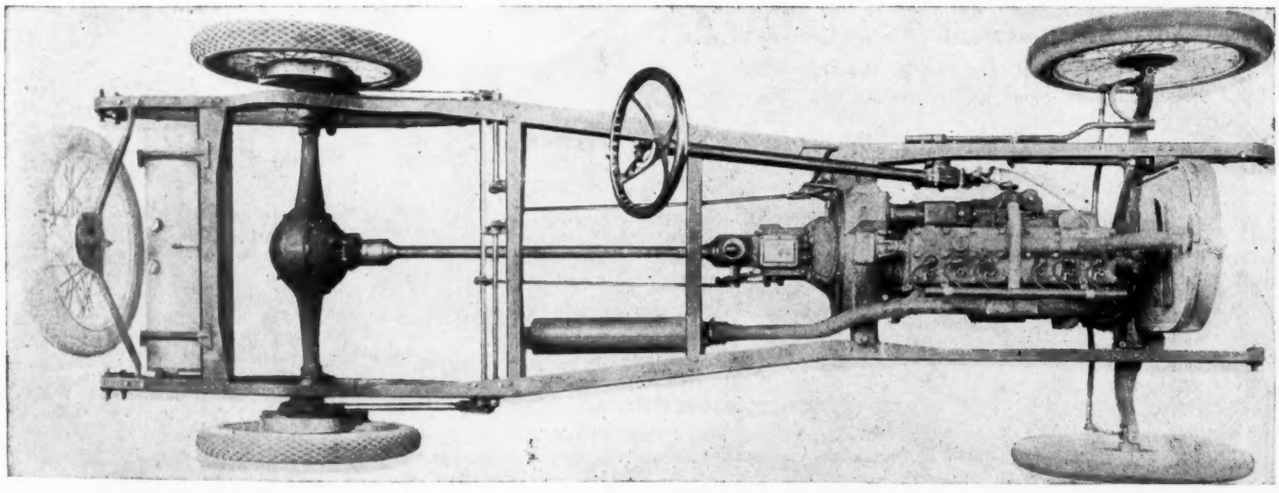
Gray & Davis equipment is used for starting, lighting and ignition. The storage battery is a Willard and throughout full equipment is used. The body is of a moulded form, with lake blue as the standard color. The running gear wheels and windshield frame are finished in pure white enamel. The price is $1,250 f.o.b. Chicago, with $75 extra for a set of Houk wire wheels.

Classic a New Assembled Car

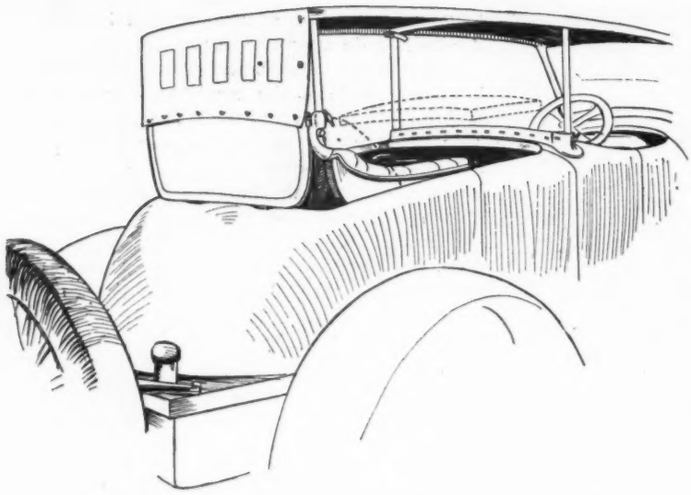
The Classic is an assembled job employing a standard Lycoming 3½ by 5 four-cylinder engine, Borg & Beck clutch, Mechanics' Machine gearbox, Gemco floating axle, Gemco steering, Youngstown radiator, and other well-known standard parts. It has a wheelbase of 114 in. and a tire



Chicago light six chassis, showing double-drop frame



Chicago light six chassis, showing how frame tapers at the center. Note wide rear allowing wide body construction



On the Paige roadster the rear seat folds into the body

size of 33 by 4. It is sold completely equipped, being provided with a spotlight and bumper, at $885 f.o.b. Chicago.

Springfield Body on Detroit Electric

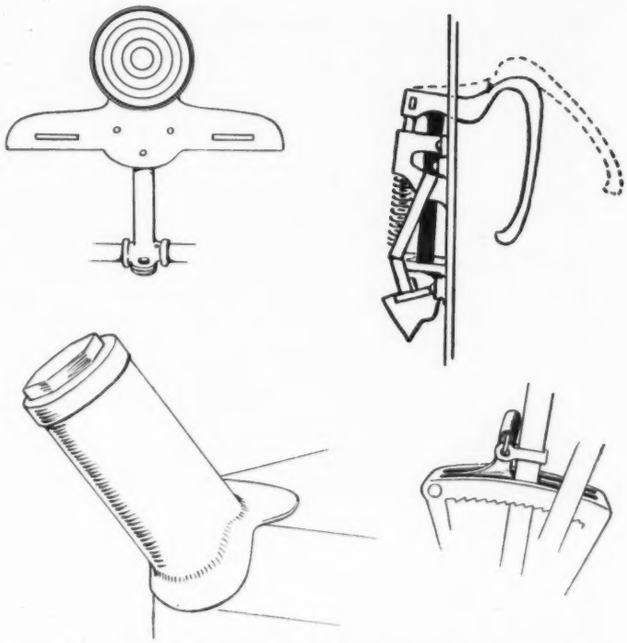
Of the new bodies, probably the most distinctive is the Springfield type body on one of the Detroit electric exhibits. This in an adaptation of the Springfield convertible principle incorporated with the brougham style of body. With the rounded front hood the car resembles a gasoline product quite closely. The part corresponding to the radiator has a high-dome crown effect very similar to the latest type of gasoline car front ends. This new body is fitted to the model 69 chassis and sells at $1,775 f.o.b. Detroit.

Scripps-Booth Has a New Body

A new town car style of body is shown by Scripps-Booth. This body is on the limousine style, with the roof only over the passenger compartment and not over the front or driver's compartment. It is fitted with a sloping windshield and the body line from the dash to the rear of the front compartment is dropped slightly below the line of the passenger entrance door. The trimming and upholstery is in leather in the front compartment and cord for the passengers. The body is relieved by a white trimming line at the point of juncture between the hood and the cowl. There is also a white stripe running over the top of the cowl and along the side line, extending around the body.

Ohio Electric Shows New Model

An entirely new model is shown by the Ohio electric. Practically the same as its predecessor, it has been reduced in price from $2,900 to $2,380, due to its greater standardization in manufacture. The cut in price has been possible largely because of reduction in the number of options allowed to purchaser. In the previous model it was customary to allow an extremely wide range in upholstery and color. Only three colors are now given as optional and four styles of upholstery. The colors are Ohio grey, Ohio blue and Roadster green. There also have been some detail alterations in the structural work of the body and fenders which improve these parts proportionally.

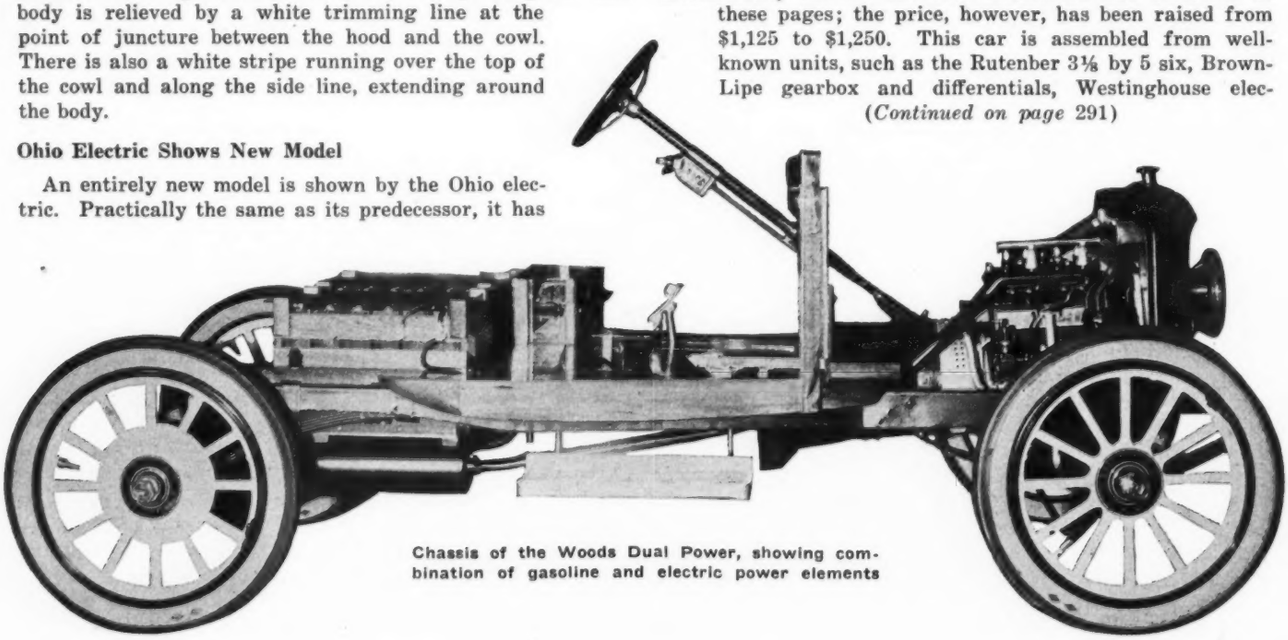


Upper left—Regal tail-light and license plate holder. Upper right—Bonnet clip on the Chicago six. Lower left—Mercer tank filler. Lower right—Stutz control lever gate lock for neutral position

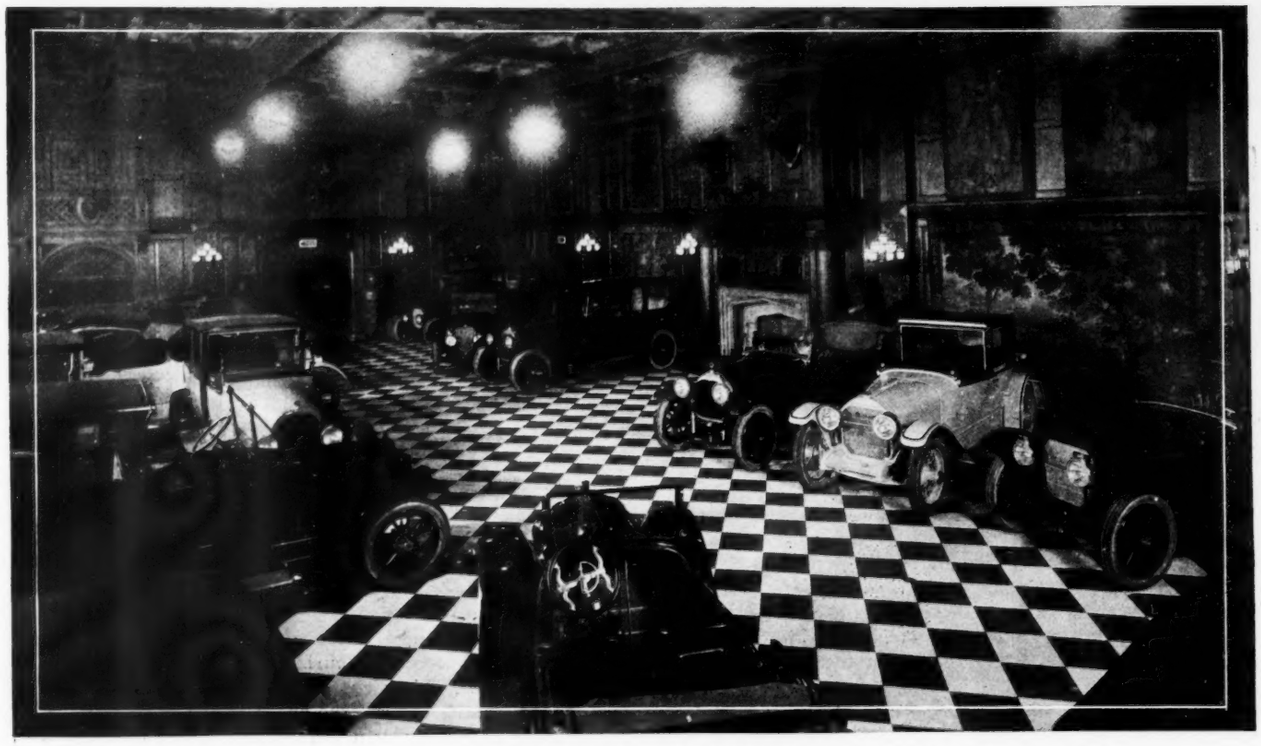
Glide Raises Price

The Glide car, made by the Bartholomew Co., Peoria, Ill., was not exhibited at the New York show but is at Chicago. Mechanically the car has been illustrated and described in these pages; the price, however, has been raised from $1,125 to $1,250. This car is assembled from well-known units, such as the Rutenber 3⅛ by 5 six, Brown-Lipe gearbox and differentials, Westinghouse elec-

(*Continued on page* 291)



Chassis of the Woods Dual Power, showing combination of gasoline and electric power elements



General view of Chicago's second annual salon held in the Elizabethan room of the Congress Hotel

Custom Bodies at Chicago Salon

Exclusiveness Characterizes Exhibit Which Includes Six Makers Besides Four Showing Last Year—Disbrow a Feature

CHICAGO, Jan. 29—Chicago's second annual automobile salon, which opened to-day with a dozen exhibitors in the Elizabethan room of the Congress Hotel, gives evidence of the well-established demand for exclusiveness. This feeling, which prompted some of the largest dealers to put out the stock chassis with high class, custom made bodies, is the fundamental reason back of the salon. New York has had its salon for a dozen years, but only recently has exclusive body trade achieved prominence in other cities.

A year ago the first effort was made to meet this situation with an exhibition in which exclusiveness would be the keynote. Four manufacturers sensed the psychology of the move and got together in the first Chicago salon. These four were White, Simplex, Brewster and Lancia. This year there are all of the first four and in addition Locomobile, Daniels, Fageol, Doble, Murray and Disbrow.

Prices vary in accordance with the degree of artistic handiwork and expensive material, the Fageol, at $9,500 for the chassis and $12,000 with the elaborate touring body, representing the maximum. The cars, however, which represent the spirit of the salon better than anything else are those on well-known chassis but fitted with bodies that represent the individual art of the custom body builder.

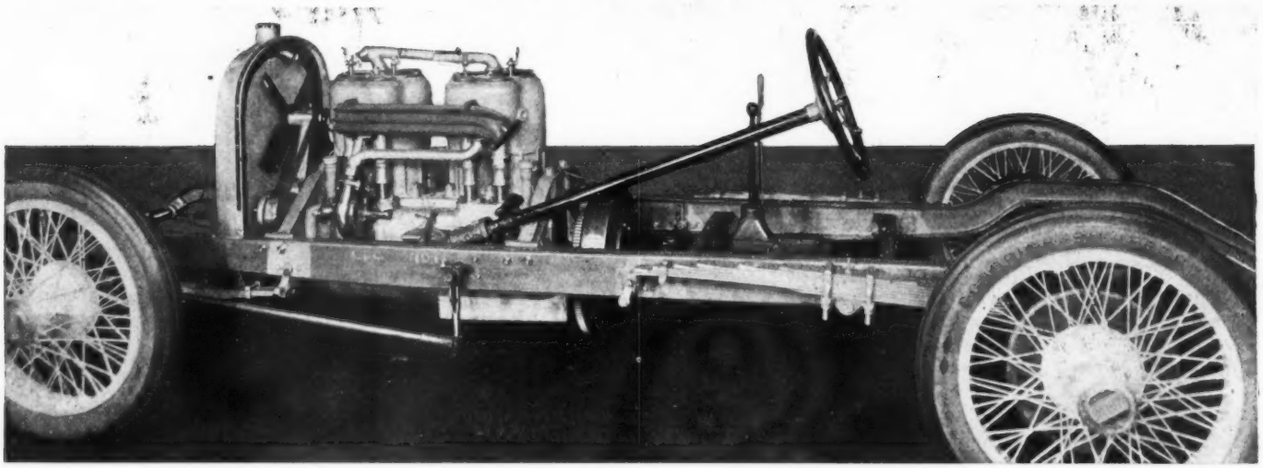
People come to buy these cars and the actual proportion of prospects to visitors is far in excess of the National Shows. Price is the last consideration with those who buy at the salon. The purchaser of the custom-made shoe bears the same relationship to the buyer of the stock product as the purchaser of a salon car bears to the stock car buyer. It is the desire for individuality and style.

Two new cars not seen at the automobile salon in New York are at the corresponding event in Chicago. These are the Fageol car, described in THE AUTOMOBILE for Jan. 25, and a sporting and speed design by Louis Disbrow. In addition, C. P. Kimball is showing some bodies that were not seen in New York, including a striking touring car with a number of new and ingenious features mounted on the new Fageol chassis and a landau with some interesting characteristics mounted on the Doble steam chassis.

Many of the cars seen in the New York salon have been moved to Chicago directly, while other companies are showing similar cars but finished in different colors. The White company is showing the same line of bodies, including two limousines, a cloverleaf and a touring car, all by Rubay. This is quite similar to the line shown in the East, but the colors are somewhat different.

Altogether, the salon is a very domesticated exhibition. There is a Lancia there to give a foreign touch, but this is obviously a chassis that has not lately arrived in the country, although it represents the latest practice of the factory.

The new Disbrow car, which is the real new thing at the salon, is a product of the shop of Louis Disbrow, former driver of racing cars. It is entirely a speed design and is shown in a special aluminum body made by Disbrow in his Cleveland plant. There is very little to the body besides the hood over the motor and a pair of racing style seats. The bodies are made up individually to suit the size of the purchaser. A unique point is the employment of bicycle-style fenders which turn with the front wheels, so that,



Chassis of the Disbrow speed car. Wheelbase is 114 in. on both models, the only difference in the two being that the engine of one of 5 1/10 by 5½ and the other 5¼ by 7 in.

although they are small, the driver is protected from the mud spray while turning a corner. The power plant is a Wisconsin product designed to Disbrow's specifications. The car is furnished in two models which are interchangeable in all respects and only differ in the engines. Both of these are T-heads, with the cylinders cast in blocks of two. The smaller engine of the two employed is 5 1/10 by 5½ and the larger 5¼ by 7. Both of them have steel pistons with exceptionally light alloy steel rods. The crankshaft is a racing style made rigid and carried on three large main bearings, with pressure oil feed. Although the difference in bore of the two engines is 0.15 in., the valves are the same size and are interchangeable. They are 2⅞ in. in diameter and are made from tungsten. The valve drive is conventional, being through helical gears, with the cam layout somewhat similar to that used on racing cars. The cams approach the constant-acceleration type with a long dwell and a quick lift. The clutch is a Borg & Beck multiple disk and the gearbox a three-speed Warner. Standard final drive ratio is made to suit the purchaser.

Car Practically Hand-Built

American ball bearing floating axles are used. These are special axles cut directly from the billet for the car. In fact, the entire machine is practically hand built and fitted throughout, and, although an assembled car in the final analysis, the parts are in most instances special and designed to meet the high-stresses of fast driving. The frame is a product of the Hydraulic Pressed Steel Co. and the wheelbase is 114 in. on both the large and small models. Both sizes carry 33 by 4½-in. tires, and the prices are $3,500 for the larger car and $2,650 for the smaller.

The electrical equipment, including lighting, starting and ignition, is Bosch. Double ignition is used with two sets of plugs mounted on each side of the T-head engine. The carbureter is a Miller racing type. A speed of 80 m.p.h. is claimed for the smaller and 90 for the larger model.

As always, the salon is the place for an exceptional line of body exhibits. Locomobile is showing a four-passenger roadster in cream with fine black striping. A green limousine and a cream-colored landaulet are also shown by the same concern.

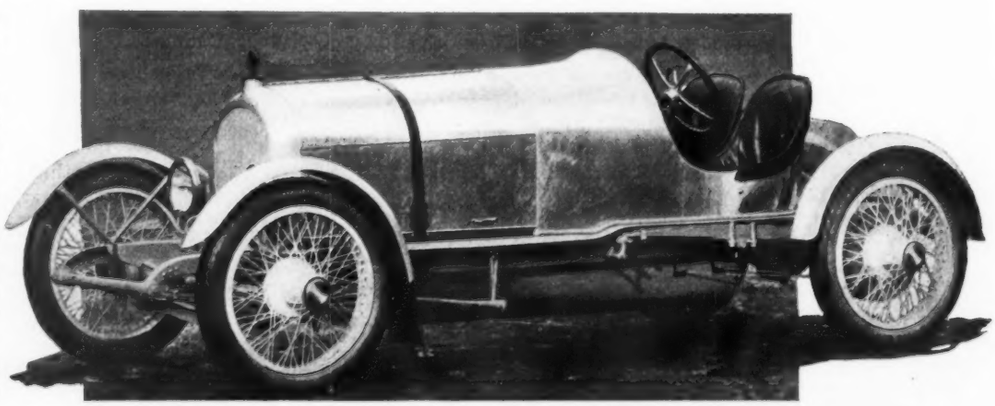
Simplex is exhibiting a cut-away polished chassis, as well as an attractive six-passenger touring and a black limousine. The six-passenger body does not carry the extra seats concealed but folded directly against the backs of the front seats.

Brewster is exhibiting a red two-passenger roadster with red cloth upholstery. There is also a four-passenger roadster in Brewster green which has a neat little feature in the way of plunger door locks allowing the door to open when they are pressed. Green leather upholstery is used on the driver's seat of a Marmon landaulet made up by the C. P. Kimball company. The interior is finished in green plush.

Fageol Priced at $12,000

Probably the most expensive car on the floor is the Fageol with the Kimball gray green touring body. As it stands it is listed at $12,000. It has adjustable front seats which slide back and forth to suit the occupants. It is fitted with a Victoria top lined with silk plush. The outside of the top is mohair. The floor coverings are also of silk plush over the mahogany floorboards. The ventilators in the top of the hood are striking and also tend to relieve the long line of the hood covering the Hall-Scott aviation engine housed within. The sale price of the engine alone is $5,400.

The Murray and the Daniels cars that were shown at New York are at the salon. The former exhibits a green seven-passenger touring car and the latter a touring design painted white with mahogany trim.



Disbrow sport car, built by Louis Disbrow, former racing driver. It has a special aluminum body and bicycle-type fenders

17 New Accessories at Chicago Show

Although Not as Numerous as the New Things at New York, as Great a Variety Is Evident in the Display

ELSEWHERE in this issue it is pointed out that the facilities for the display of accessories are not nearly as favorable at the Chicago show as at New York. However, in spite of the fact that these circumstances necessitate the scattering of these devices into such spaces as are unavailable for car exhibits, seventeen entirely new devices were brought out at this show by fifteen manufacturers. These accessories are briefly described and, where illustrations were available, illustrated in the following pages. There are no two things alike, an unusual feature when the large number of exhibitors is considered.

Warner Wheeltilt

This device converts the Ford steering wheel into a tilting type. It is a snap hinge, one side of which is bolted to the end of the steering column and the other attached to the steering-wheel hub in the same manner that the wheel was originally attached to the steering column. The wheel is held in the steering position by a latch that may be snapped out, allowing the wheel to assume the tilting position. Price, $5.—Warner Gear Co., Muncie, Ind.

Solar Duplex Headlight

There are two lights in one in this headlight. The upper one is for country driving, and resembles the standard headlight; the lower is similar to a side light and used for city driving. The large light has a reflector over it of 9½ in., and is fitted with clear glass and an 18-c.-p. bulb. The small reflector is 3½ in. in diameter, fitted with a dimming lens and a 12-c.-p. nitrogen bulb. These lamps can be made for practically any electrical system or to fit on any car. Finished in brass, in black, or in nickel and black. Price per pair, $20.—Badger Brass Mfg. Co., Kenosha, Wis.

Motor Eye

Temperature of the cooling water is given by this instrument. It comprises a thermometer which enters the water within the radiator and registers on a disk mounted on the filler cap. Made in a variety of types, for use on different makes of car, in the standard type with round dial, it sells for $5.—Metalware Corp., Chicago.

Shakespeare Carbureter Fittings

Fittings for all carbureters, consisting of a lever for operating the primer and temperature control mounted either on the dash or steering column and a warm-air stove for attachment to the exhaust pipe of the engine, are now available. A sufficient flexible hose is also supplied for connecting the stove with the carbureter. Price of steering-column control, $2; of cowl-dash control, $1.50, and of the stove, 50 cents.—Shakespeare Carbureter Co., Kalamazoo, Mich.

Motor Eye radiator thermometer

Stewart Warner Speedometer Drive

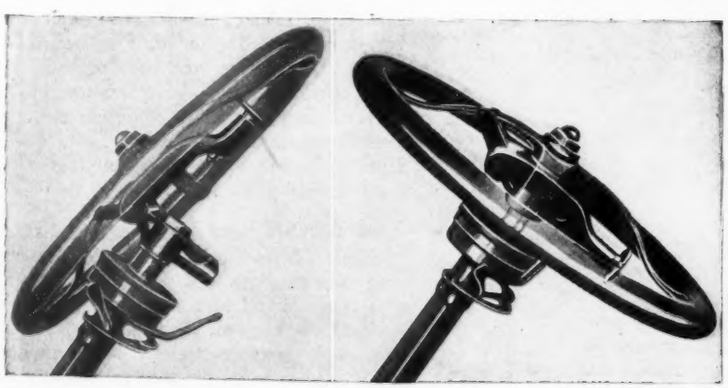
This speedometer drive employs a spiral gear completely inclosed and mounted at the rear of the gearbox. It may be mounted on any standard gearbox and requires no mechanical changes in construction. Due to the inclosed feature the gears run in oil and all dust is excluded. Two new speedometers with extra large odometer figures are also offered. A feature that is incorporated is a novel odometer resetting device, operating the same as the reset device in a stem-winding watch. A knurled knob mounted at the right of the speedometer case is pulled out and the odometer figures reset in an instant. —Stewart Warner Speedometer Corp., Chicago.

West Cast Steel Wheel

These cast steel truck wheels, made in one piece, are designed to replace wooden wheels. These wheels are said to be lighter than wood and to possess none of the disadvantages of the wood construction. They are not affected by climatic changes and are guaranteed for the life of the car. Either pressed on or demountable tires may be used. The price is $30 to $40 for set of four.—West Steel Casting Co., Cleveland, Ohio.

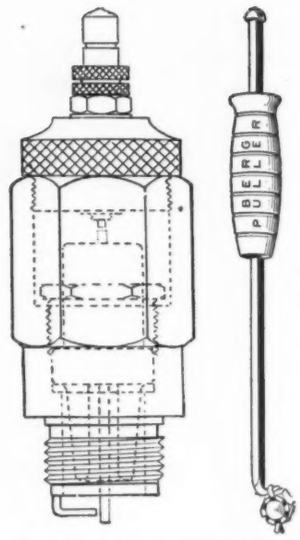
Protector Spark Plug

This spark plug has the porcelain completely housed in the metal bushing and covered at the top by a horn-fiber cap. This cap carries the secondary terminal and leaves a gap between the terminal,



Left — Warner Wheeltilt for Fords is a special hinge

Right — West cast steel wheel



Left—Protector spark plug
Right—Burg cotter-pin puller

stud and the electrode, acting as an intensifier to produce a hotter spark. The firing points are nickel-alloy steel made in one piece without welding. Price, $1.50.—Wales-Adamson Co., 1402 South Michigan Avenue, Chicago.

Lipman Air Service Station

This station in form resembles a curved gasoline pump and comprises a cast iron base holding an electric motor and a four-cylinder air compressor, directly connected to 28 ft. of hose contained in a compartment just above the base. The hose is reached by means of a hinged door, and when the pump is automatically started closing the door stops the pump. A 14-in. opaque electric light globe is mounted at the top of the column, standing about 9 ft. above the street and bearing the words Free Air. Price, $105.—Lipman Air Appliance Co., Beloit, Wis.

Vesta Searchlight

A mirror, a Cutler-Hammer switch located in the handle and a bracket designed for the car to which it is to be attached are features of this searchlight. The body of the lamp is heavy steel and may be enameled in any color to match the finish of the car. The mirror is 3/8 conflex condensing type and is placed so that it can be quickly focused to obtain a rear view. The reflectors are brass heavily silver plated and all lamps are equipped with Mazda nitrogen-filled bulbs. The price of 7¼-in. light, finished in black, is $8; finished in nickel with brass doors, $8.50; finished in any color, $2 extra.—Vesta Accumulator Co., 2100 Indiana Avenue, Chicago.

Easy-on Tire Chains

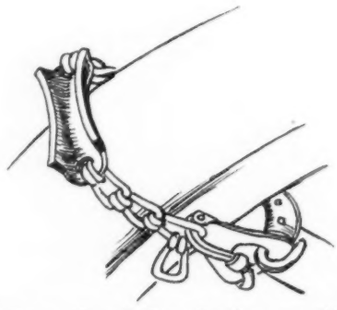
Traction is obtained by using individual cross-chains secured to the spokes. The device consists of a gripping member that is a half-hourglass section and held to the tread of the tire by chains attached to a catch snapped on a spoke. This gripping member is so formed that it does not tend to cut the tire, and the fasteners on the spoke are leather-covered to prevent injury to the paint. Another feature of these chains is the method of attachment to the spoke, this being done by a snap catch that may be fastened or removed in an instant. Four chains are used for each rear wheel and the sets are made in three sizes. The prices per set are: 3 to 3½ in., $3; 4 to 4½ in., $4; 5 to 5½ in., $5.—Woodworth Mfg. Co., Niagara Falls, N. Y.

Burg Cotter-pin Puller

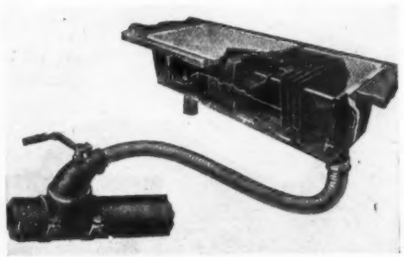
The handle on this cotter-pin puller slides along the shank in a manner that permits removal of the pin by impact after hooking into the eye of the cotter-pin. The tool consists of a short steel rod about ¼ in. in diameter having a small hook at one end, carrying a sliding handle and headed at the opposite end. It is made in two styles: black finish, $1; nickel-plated, $1.25.—Wales-Adamson Co., 1402 South Michigan Avenue, Chicago.

G. L. W. Spring Oiler

The G. L. W. spring oiler consists of a felt pad, metal-covered, which lies flat on the top leaf of the spring. The felt is hollowed out in the center and carries a quantity of oil, which gradually works its way down over the sides of the spring leaves and thus in between the leaves, giving a constant inner-leaf lubrication. The pad is attached simply by snapping it in place. The advantages of spring lubrication in preventing spring breakage and spring squeak, and also in improving the riding quality and tire life of the car, are well known. The device sells for 20 cents.—Hudson Sales Co., 7 East Jackson Boulevard, Chicago.



Easy-on tire chains, showing mounting



Vesuvian exhaust-type heater

Above—Vesta searchlight
Lower—Steel brake shoe for Fords
Right—Lipman air service station

Vesuvian Heater

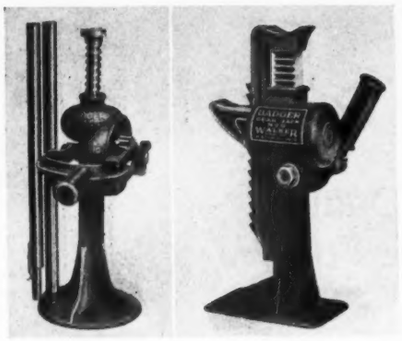
This exhaust-type heater comprises a heating chamber mounted in the floor, this chamber being made of thin steel having on the interior several steel veins to deflect the gases so that they radiate heat to the exterior. The outside of this chamber carries many steel radiating fins, and the entire heating element is mounted in a pressed-steel case beneath the radiator, which is set flush with the floorboards. Price, $15.—Reliable Auto Heater Co., Cleveland, Ohio.

Steel Brake Shoe for Fords

This brake shoe for Fords is steel throughout, and is claimed to be indestructible. The feature of the steel construction, in addition to the increased strength, resiliency and ease of relining, is lightness. These shoes are packed in cartons containing one complete set, including springs. Price, per set, $2.—Humboldt Machine & Stamping Co., Long Island City, N. Y.

Heco Vacuum Feed

Suction from the intake manifold operates this gasoline feed system. The system is embodied in a small tank located beneath the hood on the fuel line between the main gasoline tank and the carbureter. Suction draws the gasoline from



New types of Badger jacks. Screw type is at left and gear type at right

the main tank into the vacuum tank, and it is fed from there by gravity to the carbureter. The tank proper has an upper and lower chamber, the upper containing a control mechanism and the lower acting as the gravity feed tank. These two chambers are separated by a metal partition carrying the valve mechanism and the single valve. This valve controls the flow of gasoline from the upper to the lower chamber, and is actuated by a float. It may be installed on any car. Price, $8.—Heinze Electric Co., Lowell, Mass.

New Badger Jacks

Two new styles of Badger jacks are a screw type and a gear jack. The screw jack is of the conventional type, driven by two pawl-operated bevel gears, the feature being a thumb nut that allows speedy adjustment and a long jointed handle permitting the jack to be readily operated. Price, $4.50. The gear jack is combination worm and gear driven, giving extreme leverage with small pressure. Rapid action of the jack up and down is secured by revolving the handle. The worm is said to lock the jack, making it impossible for the jack to drop under load. A two-piece, 20-in. handle is included. Price, $8.50.—Walker Mfg. Co., Racine, Wis.

Dixon's Non-leak for Fords

This graphite grease is compounded for the Ford differential and is said to prevent any leakage going into the axle. It is packed in 2½-lb. cans, each containing just enough for one Ford differential. Price, 85 cents per can.—Joseph Dixon Crucible Co., Jersey City, N. J.

Jackson Electric Valve Grinder

This portable motor-driven tool for grinding poppet valves comprises a vertically mounted electric motor driving the valve-grinding head with a "back-and-forth" movement by means of a gear, connecting-rod and offset crank. Tools are made in two sizes, No. 1 for grinding valves up to 2¼ in. in diameter, driven by a 1/10-hp. motor and particularly adapted to service-station work. No. 2 is for continuous heavy-duty manufacturing purposes, and will grind valves up to 4 in. in diameter and is driven by a ⅛-hp. motor.—Wales-Adamson Co., 1402 South Michigan Avenue, Chicago.

White's Oil Distributer

Excess oil dripping downward into the crankcase of the Ford is caught and distributed to the rear crank pockets and reservoir by this device, which keeps it at the same level in each pocket. It consists of a series of troughs made of steel combined to form a single unit and placed inside the crankcase on the right side. It is said that accumulation of oil under the cranks is prevented and the motor properly lubricated whether ascending or descending a grade. To install, the crankcase hand hole cover is removed, the distributer slipped in place and the cover replaced. Price, $3.—Evapco Mfg. Co., Detroit, Mich.

Jackson electric valve grinder, furnished with either 1/10 hp. or 1/8 hp. motor

No-Stitch Curtain Cement

This cement permits of a quick and easy repair of celluloid lights in top and side curtains without removing the curtain from the top. The manufacturer claims that it makes a water-tight union which is not affected by heat or cold. It is put up in 1 oz. cans, sufficient for repairing a number of lights, retailing at 25 cents, and in 1 pt. cans for large consumers at $2.—Auto Products Mfg. Co., 40 Elm Street, Buffalo, N. Y.

Four New Cars Appear at Chicago Show

(*Continued from page* 286)

trical equipment, Stewart-Warner vacuum system, etc. The body is roomy, having a 47-in. rear seat and a 42-in. front. It is finished in meteor blue with black running gear. Wheelbase is 119 in. and the car is provided with 34 by 4 tires. A detachable sedan top is provided for $200.

Monitor Has Standardized Chassis

Two chassis not previously seen are exhibited by the Monitor company. These are a four and a six, and many of the parts of the two are interchangeable. The motors are a six-cylinder Continental 7 W 3¼ by 4½ for the six, and a four-cylinder Golden Belknap & Swartz for the four. The electrical equipment is made by the Heinze company. The carbureter for the six is a Stromberg and the four a Schebler, and the chassis parts are made by other well-known parts makers. The wheelbases are 110 and 117 in. respectively for the four and six, and the prices are $895 and $1,095.

Some Concerns Exhibit Outside

Some of the companies which were not able to obtain space at the show are exhibiting outside. Across the street from the Coliseum the Comet Automobile Co. has its touring car on exhibition. This concern has its home in Decatur, Ill., and is showing a car with a six-cylinder 3⅜ by 5 block motor equipped with Delco ignition, Dyneto starting and lighting and a Zenith carbureter. The clutch is a Borg & Beck and the axle is floating. The springs are cantilever, 50 in. long. This car sells for $1,185 and is equipped with a double-cowl body.

At the New Southern Hotel is the Colonial, made by the Colonial Automobile Co. of Indianapolis. This is an assembled six with an overhead valve engine operated by exterior pushrods and rocker arms. Over the head of the engine there is a detachable cover plate and the priming cups are in the side of the cylinders. The wheelbase is 116 in. and the chassis construction is simple, with a drop frame used in connection with cantilever spring mounting. The clutch is an inverted cone and the gearbox has three speeds and New Departure bearings. The axles are the product of the Lewis Spring & Axle Co., with the drive pinion on New Departure bearings and the differentials carried on Gurney bearings. The car is listed at $995, including complete equipment, tool kit, etc.

Cannot Define Gasoline

Gravity Useless for Determining Quality—National Gasoline Committee To Be Formed

By A. Ludlow Clayden

THAT there is a great deal of fraud in the gasoline business, that gasoline cannot now be specified without the risk of raising its price, that engines of the future must be made to burn fuel of a lower volatility and that the fuel situation needs the concentrated study of both the automobile and the oil industry were the main conclusions reached at the most important meeting ever held to discuss gasoline. This meeting took place at the Bureau of Standards in Washington Jan. 25 and 26, and was a "hearing" called by a joint committee of the Bureaus of Mines and Standards.

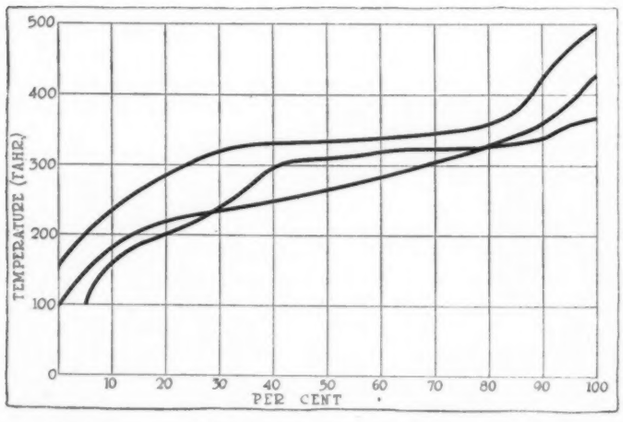
There were present members of nearly all the large oil firms, representatives of the oil men's associations, individual members of small oil firms, representatives of State and city legislatures from all over the country and representatives of the S. A. E. For two 6-hr. sessions they discussed and argued every phase of the situation, and the amount of real information gathered was enormous.

The wonderful thing about the meeting was the spirit of co-operation. There were no sides to the question, one did not find the oil men in one group, the legislative people in another and the engineers in a third. Each was ready to appreciate the difficulties of the other. In brief, the situation appears to be as follows:

There is plenty of gasoline to care for future years, but to keep the price down it will be essential year by year to lower the volatility. This the engineers are prepared for and they think they will be able to take care of the situation. The engineering attitude is that almost any kind of fuel can be provided for; the essential thing is to know what is coming.

Retail Fraud a Trouble

The greatest abuse at present is fraudulent action by retailers, and the discussions made abundantly clear the fact that it will not be easy to frame a law which will prevent fraud. It would seem easy to specify gasoline in some way so that the mixing of anything else with it could be detected, but this is apparently not possible because of the extremely complex nature of the liquid.



Distillation curves for different gasolines giving about the same service can vary as much as or more than these shown and nobody can say whether one is really better than another

To appreciate the purpose of the meeting, how it arose should be explained. The District of Columbia wished to control gasoline and applied to the Bureau of Mines and the Bureau of Standards to tell them how to do it. These two bodies appointed a joint committee which corresponded with the industry and collected a considerable amount of information. They then called the meeting and placed before it three possible schemes. It must be understood that neither of these schemes is fathered by the bureaus. They were suggestions derived from the correspondence examined, and the method of conducting the meeting was to ask each speaker to discuss the three possible schemes and then make any suggestions of a different nature that might occur to him.

Possible Schemes Submitted

A—Recommend that nothing be done along the lines of national, state, municipal legislation relating to petroleum motor fuels.

If you favor A, the possible effectiveness of such a recommendation should be considered, that is, whether in the present state of public opinion such a recommendation would not, as a matter of fact, result in independent state and municipal legislation. It has been represented to the committee that legislation is inevitable, and that if the national government does nothing such legislation must be discordant.

B—Adopt standard specifications for "gasolines" and require that all motor fuels sold in interstate commerce under the name of "gasoline" comply with and be sold under the designation of one of these established specifications.

If you favor B, how many standard specifications should be adopted, and why? Would such specifications need frequent revision? If so, how could state and municipal legislation be kept uniform under this plan?

C—Do not adopt any standard specifications, but simply require that all gasolines or motor fuels sold in interstate commerce be labelled as to their 20 and 90 per cent (or 95 per cent) distillation temperatures, so that the purchaser would at once know the degree of volatility of the motor fuel he was purchasing. Thus for motor fuel labelled 100-200, the numbers would mean that at least 20 per cent would distil over below 100 deg. Cent., and at least 90 per cent (or 95 per cent) below 200 deg. Cent.

This plan embodies the fundamental principles of the pure food legislation. It provides for every kind of petroleum motor fuel, simply requiring that it be "labeled" as indicated.

Should the temperature of the 85 per cent fraction, or of the 90 per cent fraction, be specified? It has been pointed out that the distillation curves of some gasolines show a sharp upward bend beyond the 90 per cent fraction, and that by specifying the temperature of the 90 per cent fraction and including a further requirement that the dry point shall not be more than —degrees above the 90 per cent fraction, the presence of an undue amount of heavy ends would be eliminated.

Should limitations be placed upon the meaning of the term "gasoline"? For example, the distillation temperatures of petroleum products sold as gasoline have been steadily increasing. Should some limit be fixed beyond which these products should not longer be termed "gasoline"? At the present time these limits have not yet reached the 150-300 deg. "cut," which is still known as kerosene or illuminating oil. Some have recommended that the limits for gasoline be placed at a point not necessarily where satisfactory operation is possible with existing engine equipment, but at least where any gasoline engine can start without special preheating devices.

(*Continued on page* 301)

Foreign Trade Department

Legalized Co-operation in Export Sales, Formation of a Sound Shipping Policy and a Bargaining Tariff Are the Three Great Essentials for Our Foreign Trade

1250 Delegates Attend America's Export Convention—National Foreign Trade Council Stages Best Foreign Trade Convention in Our History —Automobile, Truck and Accessory Makers Poorly Represented

By David Beecroft

PITTSBURGH, Jan. 27—All of the 1250 delegates attending the fourth annual convention called by the National Foreign Trade Council have had an opportunity for 3 days to hear every aspect of foreign trade discussed; have heard about competition after the war; have been told how large and small manufacturers can co-operate in foreign trade as is done in European countries; have been told about the Webb bill and how, if passed, it will permit combinations for foreign trade; and have been told of the thousand and one other problems connected with greater foreign trade.

The fact that 1250 delegates attended as compared with less than 500 at the convention a year ago recites how interested all makers are in foreign trade, for in these 1250 delegates are represented hundreds of small makers as well as the largest manufacturing combinations in the country. Besides manufacturers there has been a large representation of exporting houses, very large representation of chambers of commerce from every state and large representations of manufacturers' organizations. The Pacific Coast delegates, 150 strong, arrived in a special train; there was another special trainload from Washington and New York. Over fifty delegates arrived from Texas.

The representation of automobile and automobile accessory men was not as large as anticipated. Not over a dozen of the largest companies had their export managers present; in addition nearly a score of accessory companies were represented by export men, the tire companies leading in this representation. Very few representatives of motor truck makers were present, excepting those concerns which are large makers of both passenger cars and trucks.

Such a convention as the present one gives a good portion of its time to the consideration of broad national problems affecting export trade, and the manufacturer expecting to go home with all pockets filled with specific information to meet his particular needs in export work will generally be disappointed. Such a convention with practically every industry in the country represented cannot resolve itself into groups for different industries, but a good part of one afternoon, a whole evening session and added sessions did consider specific export questions. This was made possible by dividing manufacturers engaged in export work into two groups; large manufacturers and small manufacturers. These groups met separately. Each considered the broad question of how to co-operate in export trade.

The work of each group largely followed the plan of submitting questions which were answered by men who have spent years abroad in export trade. With the group of large manufacturers many tangible plans for closer co-operation were outlined.

The program was not quite so definite with the much larger group of smaller manufacturers, many of whom

Convention Deductions on Export Trade

1—The Webb bill must be passed by the Senate to legalize co-operation of U. S. A. manufacturers in pushing export trade.

2—All European countries have built up their export sales on co-operative methods which are fostered by their governments.

3—The new Europe at the close of the war will be a financially strong Europe—one ready to meet all loans, redeem all pledges and care for all obligations.

4—The world's financial center will still be in Europe after the war.

5—Time credits will have to be extended to all European countries after the war.

6—Few European countries will dump low-priced goods in our market for several years after the war ends.

7—Japan has driven our ships out of Pacific Ocean trade.

had not had any experience in export trade, yet all had come to the convention with the hope of going away with a completed code of procedure for building up export trade in any country in the world. Naturally such delegates went home disappointed because it was not within the province of such a convention as the present one to go into such details. But in the group meeting, which partook much of the nature of an old-fashioned Methodist experience meeting, literally dozens of concerns that have been in the export field for some years told how they sold their goods in different countries, and offered to help any delegate.

Information Readily Available

The management of the convention did good work in this matter of giving general information, and had appointed over forty trade advisors who were competent to give advice on foreign trade in nearly as many different countries of the world. It was possible for any delegate to meet these individual trade advisors and get information on any country.

The National Foreign Trade Council deserves congratulations on the manner in which it worked to serve the varied needs of such a wide range of delegates. Another year this phase of the convention will certainly have to receive more attention. It is questionable if in future conventions it may not be desirable to divide the convention broadly into two large classes:

Class A: The consideration of broad national and international questions affecting export trade.

Class B: The consideration of questions specific to different groups of manufacturers engaged or contemplating engaging in export trade.

There is such a broad difference in the requirements or wishes of the two divisions as to perhaps justify dividing the entire convention into two such groups, with the exception of perhaps one half-day session.

Scope of the Convention

Much of the present convention was given over to what might be designated addresses, papers and discussions on broad national and international questions affecting export trade. For example: A forenoon session considered various questions with regard to matters in which the entire question of a merchant marine was considered, and in which valuable information on the number of ships being built each year since the war started; the reduction in tonnage carried by American ships since the war started; the increase in tonnage carried in Japanese ships since the starting of the war; the amount of ship building being done in our own shipyards for home demands and the amount for foreign countries, and also a general review of the attitude of Congress toward our shipping interests since 1818; and a review of the handicaps placed on our shippers and an explanation of how our merchant marine has practically been driven off the high seas. Such a broad consideration of shipping was highly educational, but not specially valuable to the manufacturer who came to the convention to learn how to establish an export trade or how to co-operate with other manufacturers in his field or those in related fields.

The subject of shipping is vital to our export interests, and it is unfortunate that the presidents or general managers of perhaps a hundred of our automobile companies, as many truck makers and as many accessory makers were not present to get the spirit of the convention. True, a very scant few of these had their export managers present, but while the message was good for the export manager, it was more suited to the president or general manager, who should be familiar with these broad questions because of the greater power he can yield in correcting such abuses than his export manager.

The export manager was interested in the group sessions of large and small manufacturers. That was his proper place. That was where he was expected to learn and to give information, but his president should have been present for the consideration of the broader questions.

A Bargaining Tariff Needed

Perhaps as important a national issue as came up was that of foreign trade aspects of the tariff, which was introduced by Willard Straight, vice-president of the American International Corp., a New York organization formed for promotion of foreign trade, particularly in Latin America. Mr. Straight, in a lucid explanation of the present tariff, told how it is impossible to raise our present tariff schedules, and how we are sorely in need of a bargaining tariff the same as other nations possess, so that the president could have in his control the power to raise tariffs as necessary to meet with foreign competition. Such powers would give quick action, which is impossible under our present arrangements. Our present tariff is barren of any trading margin.

He told how the tariff systems of the world will all have to be revised to meet conditions when the war ends, and how the British free trade policy has already been widely changed and will unquestionably remain changed for many years when the war is over.

Mr. Straight told how different groups of nations in Europe have united in the interest of their foreign trade; of how three Scandinavian nations entered into a comprehensive trade arrangement last July; of how the British Empire and the Entente Allies have already united and formulated plans for trade co-operation; of how the Central Powers have, since the beginning of the war, been united in every act with regard to foreign trade; of how after the war the countries of the Central Powers will buy as a nation and how individuals in such a country as Germany will not be permitted to go into foreign markets as individual purchasers; and he told of a score of other broad national and international questions that the presidents of our companies should have been listening to alongside of their export managers.

The convention presented an opportunity impossible in any other convention on such subjects. They are subjects that the managements of factories should be familiar with. They are subjects on which Congress and the Senate must be moved to action on, and when such movement has to take place the president and general manager rather than the export manager are the people who will have to do the political work, if it may so be designated.

Reconstruction in France

The question of world conditions after the war was not as prominently featured as many expected. There was in this connection one particularly good address by W. W. Nichols, who was chairman of the American Industrial Commission to France which spent 45 days last fall studying the field of destruction in France and looking into the question of what reconstruction work will have to be done in France and Belgium when the war is over. The committee has a very valuable printed report in the form of a well-illustrated booklet which was on sale at the convention and which is for general distribution.

Mr. Nichols told of the zone of war destruction, which in France alone includes 750 towns, and in addition four cities of over 100,000 population each. But great as the work of reconstruction may be in the war zone, Mr. Nichols believes that it will be exceeded by the work of reconstruction through all of France.

He told of how the Touring Club of France, an automobile organization for the distribution of touring information, in co-operation with the hotel associations and other organizations, plans to spend $100,000,000 in the general rehabilitation of the resort hotel system; he told of plans that will call for 17,000 farm tractors such as our tractor makers are now producing for farm work; he told of the need of 125,000 farm plows, many of which will be used with gasoline tractors; he told of the enormous demand for other farm implements, not specifically mentioning motor trucks; he told how $75,000,000 to $100,000,000 will be needed in new textile machinery; he estimated that $600,000,000 will be needed for the replacement of industrial property in the war zone alone; and finally he told how his commission believed it impossible for France to begin dumping low-priced products on the American market for many years following the close of the war.

Mr. Nichols believes that France is very anxious for close trade relationships with us after the war. France understands the people of this country and her sympathies are strong for us. "But," continued Mr. Nichols, "it is more than probable that U. S. A. exporters will have to review their selling methods and that cash on bills of lading in New York will have to stop. Such methods do not conform with common business practice of other exporting nations and are the exception rather than the rule."

Long-Time Credits Safe

Mr. Nichols believes that after the war France will require long-time credits, but he believes that caring for these credits is rather a question to be handled by our bankers than by our manufacturers. He feels that there is no danger of financial losses connected with such long-time credits because the French national character incorporates an innate repugnance to bankruptcy. Bankruptcy is considered a disgrace in France, and so there are few dangers connected with credit extension to that country.

The New High-Efficiency Europe

After War European Nations Will Leap into World Trade Markets with All the Aggressiveness of the Battlefield

EUROPE after the war, or the new Europe, the co-ordinated Europe, the efficiency Europe, came in for general comment at a score of different times during the convention, so the unanimous consensus of opinion is that all Europe will emerge from the war as a young athlete after his weeks of hard training for the final football game or for the annual athletic meet. It will be no weakened Europe, but a Europe filled with men hardened by months of physical training and outdoor life, a Europe breathing through every pore the lesson of co-operation.

Louis E. Pierson, chairman of the Irving National Bank of New York City, speaking on American Banking in Foreign Trade, sees Europe after the war stronger financially and better equipped for world trade than before the war. Here is how Mr. Pierson puts it:

"Europe of the future will yield no less powerful influence in the world of finance than did Europe of the past.

"We dwell too much on the idea of a war-devasted, war-scarred, helpless Europe, and we have been unable to see the other Europe, the Europe of aggressiveness and power, which after the war will face the world, a better customer and a more dangerous competitor than ever before."

Comparing the United States with the various countries of Europe, Mr. Pierson called attention to the very general co-operation between government and business in nearly every country, whereas such co-operation has been hopelessly lacking in our country. He said:

"In nearly all Europe throughout every complexion of government, all the way from socialistic Denmark, through the various republics to inten-

sively bureaucratic Prussia, there has been evolved a uniform, well-defined, nationally accepted theory, controlling all the essential relations between government and business. The importance of the result hardly can be exaggerated. Every resource seems to have been fashioned into a common national weapon, to be employed in the interest of either business or government."

Contrasting our government with European governments in this respect, Mr. Pierson continued:

"In the United States the situation is almost entirely otherwise. Business is disposed to view government as a more or less respectable policeman, and government is disposed to view business as a more or less dangerous malefactor. Each appears willing to concede to the other the possibility of merit, but neither appears willing to concede sufficiently to make it possible for both to get together upon the perfectly obvious theory that their interests are identical."

Europe Is Surpassing Us

To further demonstrate the extent to which we as a nation suffer because of this lack of co-operation between government and business, Mr. Pierson cited that many European nations in spite of straining every effort in the conflict are also making more preparation for post-war trade than we are. Mr. Pierson expressed this graphically and concisely as follows:

"Nationally we appear to lack ordinary comprehension. We slumber along peacefully, secure in the business of the past and in the comforts of the present, while our competitors are up and doing.

"Why even during the period of war, Europe with its losses and disturbances has already outdistanced us in progress toward preparation for the financial and commercial struggle to follow.

"England, in spite of her traditional conservatism, is preparing to build in the foreign financial field on a scale the magnitude of which almost takes one's breath away, and in doing this is only following a theory which, for years, has been of common acceptance in foreign countries.

"Germany, in spite of enforced isolation from commercial world activities, is fostering in the foreign field every existing element of the financial power she once possessed.

"Italy, France and Switzerland are sparing no effort to extend and more fully develop their already extensive foreign financial establishments.

"Even Japan has broken away from her ancient traditions and now appears in the financial centers of the world as a power to be reckoned with.

We Do Not Get Together

"At the same time we in the United States, instead of reading these signs of danger, appear quite well satisfied with a fairly comfortable present foreign success which furnishes no reasonable assurance for the future."

Mr. Pierson ended with a scathing criticism of our people in which he bluntly accused us of not being able to get together, in spite of our generally proud thought of being called the United States of North America. Here is how he put it:

"Our weaknesses clearly belong to a nation whose people and institutions have not yet acquired the art of getting together; unorganization, the lack of co-ordination of effort, a powerful machine fully efficient in domestic things but not yet properly adjusted to the more highly complicated requirements of a world situation; 25,000 and more banks separate, individual, scattered broadcast throughout the country, with unlimited resources, and representing practically every interest in our nation, awaiting the light and impulse which will enable them intelligently and with united effort to meet whatever competition the world may present."

A Strong Financial Europe

It Will Pay Its Foreign Debts, Protect Its Foreign Credits and Redeem Its Foreign Pledges, Purely from Self-Interest

IN addition to the prevailing consensus of opinion that Europe will not be crippled in a manufacturing sense after the war and that she will be very aggressive in her foreign trade, Mr. Pierson contends that financially Europe will not be weak, in spite of the enormous war costs, and in spite of the enormous sums that will be expended in reconstruction work.

It was voiced by C. H. McIntosh, vice-president of the Bank of California, San Francisco, that we should not be misled by the fact that so much gold has come to us since the war. Mr. McIntosh claims that it is not to our advantage to drain gold from other countries to our coffers; and that our interests in the soundness of financial conditions abroad are second only to our interests in the soundness of financial conditions at home.

Mr. McIntosh charged us with being too selfish in our foreign trade, and of lacking a national comprehension of the questions of foreign trade and how to solve them. We have as individual firms traveled too much on our individual roads, and have forgotten the broad road of common travel so pursued by many foreign nations. We must cultivate a broader view of foreign trade and learn to think of the whole rather than the parts. We should learn that in foreign trade our individual interests are advanced by team work, just as in a baseball or football game.

Europe Still Financial Center

Mr. Pierson touched on one of the biggest questions in connection with finance and foreign trade when he took up the problem of the huge loans

which we have made to belligerents. The value of these foreign loans is great. These loans are really the guaranty of credit to the belligerents to enable them to buy from us and pay for, under reasonable conditions, the products we have to sell. All European countries will meet all of these obligations. There is not a symptom of doubt as to this. The Europe of the future will wield no less powerful influence in world finance than did Europe of the past. The financial center of the world has not been moved across the Atlantic because of these loans and the war.

Mr. Pierson continued on this subject:

"The new Europe of the future, viewed as the basis of foreign loans, is entirely sound. In both disposition and ability its position as a foreign debtor may be built upon with safety. It will pay its foreign debts, protect its foreign credits, redeem its foreign pledges, and for the best reason in the world, self-interest.

Credits Must Not Be Impaired

"Its credits must not be impaired. Countries like France and England, whose financial power has been built upon a world commerce, and which even during the stress of war are able to maintain the most profitable world trade in their history, will not find it necessary or desirable to face the world after the war upon any other than a sound financial basis.

"With such a background as this is it probable that the new Europe will allow us to adjust the world finances of the future to suit our purely domestic whims and without proper reference to the rest of the world?

"We speak of controlling the finances and commerce of the world. What manner of assurances have we on this point?

"Our $2,750,000,000 of gold reserve insures for us no such position, unless each dollar of it makes to the world its own particular commercial argument in the form of an offer of credit upon which a mutually profitable business may be based.

"Europe and the world buy from us now because they must, and pay us in gold because they must.

Present Advantages Easily Lost

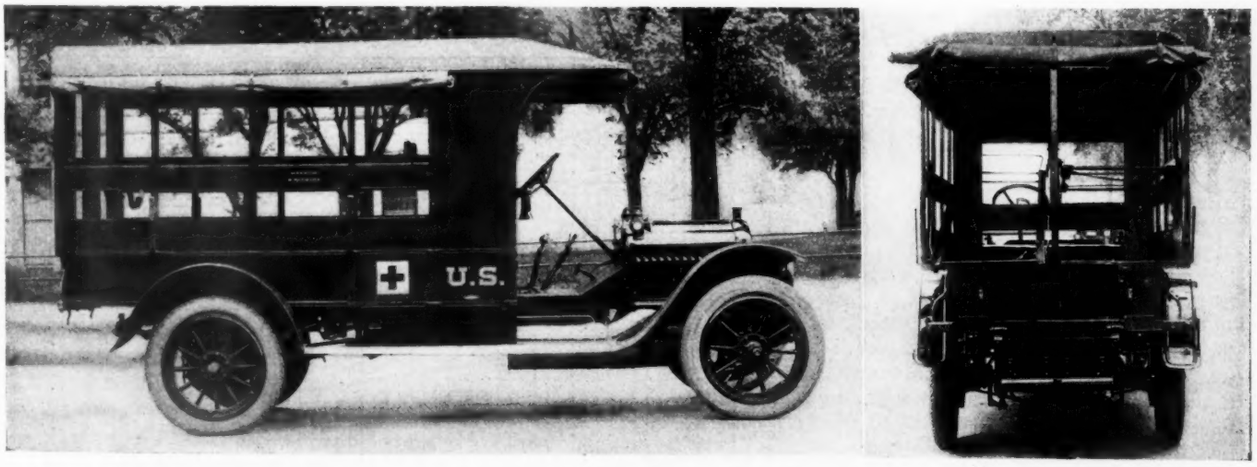
"After the war they will continue to buy from us in such quantities and for such time as may be in harmony with their own interest and convenience. The controlling interest will be self-interest.

"If we are to become the great creditor nation of the world, as we occasionally assert, we must in our attitude to the rest of the world express the quality of broadness and of liberality. The European war has conferred on us no advantage which we cannot easily lose; only our best efforts will enable us to retain even our present position."

The views of Messrs. Pierson, McIntosh and others on the huge loans of European belligerents were shared by Festus J. Wade, president of the Mercantile Trust Co., St. Louis, Mo., who in drawing comparisons between the present war and our civil war showed that we in the civil war, lasting 4 years, the cost to us was 18 per cent of our entire wealth, whereas in Europe to-day the war has not cost some of the belligerents in foreign loans three-quarters of 1 per cent of their present wealth.

"To develop foreign trade we must develop credit and we must not fear that the nations may not meet their obligations. It cannot be possible that they will fail to meet these loans."

New U. S. A. Standard Military Ambulance Design



Above is one of the new U. S. army standard ambulances, this particular vehicle being one of fifty-two recently built by the White Co., Cleveland, for service on the Mexican border. These machines have been organized into four companies, each composed of twelve motor ambulances and one ¾-ton repair truck. The plan of organization and the new body designs were worked out by a board consisting of Major Robert E. Noble, Major A. W. Williams, Major P. L. Jones and Captain A. C. Christie. The design has a capacity for eight patients seated inside and an orderly riding on front with the driver. Four patients can be carried on stretchers or litters. The two litters composing the upper tier are suspended by iron hooks with spiral spring attachments. The seats are leafed and hinged in such a manner that when they are not occupied by sitting patients the upholstered side is turned down, forming a floor on which standard U. S. Army litters may be carried. Under these deck-seats are compartments for ten 1-gal. tins of reserve gasoline and other supplies. Beneath the front seat on each side are compartments for carrying water tanks. Between the stanchions at the right of the driver's seat is a compartment for carrying emergency medicines and dressings.

61.5% Power Loss Through Tires

Internal Friction Consumes 31.2% in Front Tires and 30.3% in Rear, Professor Lockwood Tells Pennsylvania S.A.E.—Rolling Resistance Constant at 10 to 40 M.P.H.

PHILADELPHIA, Jan. 26—Tires consume 61.5 per cent of the power lost between the engine and the road wheels by internal friction, Prof. E. M. Lockwood, of the Sheffield Scientific School of Yale University told the Pennsylvania section of the Society of Automotive Engineers here last night. He also stated that the rolling resistance of a car remains practically constant at all speeds between 10 and 40 m.p.h. and that under-inflation of tires may increase the amount of power required to drive the car 25 per cent. Naturally, the latter condition would be accompanied by an approximately proportional increase in fuel consumption.

The paper was entitled "Power Losses in Pneumatic Tires," but Professor Lockwood prefaced his remarks with the statement that his investigations were not originally instituted to determine these losses. The figures and facts in the paper were incidental to a series of tests undertaken to determine the rolling resistance of a car.

The tests upon which Professor Lockwood bases his conclusions were made in the laboratory on special apparatus consisting of rollers set in motion by a calibrated electric motor. The car was anchored with the front wheels and the rear wheels alternately resting on the rollers. Professor Lockwood points out that the experiments have the limitation of being made on but one size of tire and adds that no claim is made that the entire question of tire resistance has been solved.

In summarizing the paper Professor Lockwood suggested that the present requirement is a tire which may be flexed indefinitely like a steel spring without generating internal friction and consequently heat. With such a tire, practically all rolling resistance would be eliminated. Regarding rolling resistance the paper runs:

As an example of the amount of variation of resistance with speed, the following tests are reported with readings exactly as recorded:

Rolling Resistance at Various Speeds

	Inflation in Lb. Pressure	Miles per Hour 20	30	40	Average
32 x 4 cord.....	60	11.7	11.7	13.8	12.4
32 x 4 fabric....	55	24.1	23.3	24.4	24.3
35 x 5* cord....	60	33.0	33.6	33.8	33.6

*Fitted to heavier car.

These cars differed considerably in rolling resistance, but in every case the speed of the car had little or no effect on the result. Rear wheels tests were made confirming the results obtained with the front wheels, hence the conclusion from these tests that the internal rolling resistance of an automobile is practically constant at all speeds up to 40 m.p.h.

The measurements described give as a result, the total rolling resistance of the front tire and bearings, or of the rear tires and all transmissions losses. By an independent measurement a separation can be made of the tire loss from the bearing and transmission loss. This is accomplished by jacking up the wheel until the contact between the surface of the tire is just sufficient to revolve the wheel. In this way tire resistance is practically eliminated, leaving only resistance due to bearings and transmission.

The internal power losses of the six-cylinder Chalmers chassis have been determined in this way. The tires are 32 by 4, load on front wheels, 1145 lb.; load on rear, 1545 lb.; tire inflation 75 lb.

POWER LOSSES IN 2700-LB. CHASSIS

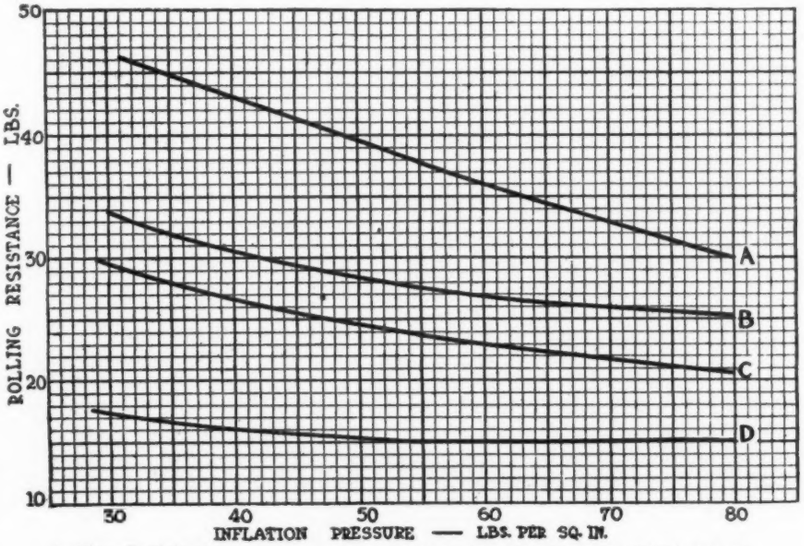
	Pounds	Per Cent.
Front tires	18.2	31.2
Rear tires	17.7	30.3
Front bearings	4.7	8.0
*Rear bearings	17.9	30.5
	58.5	100.0

*Includes transmission.

Dividing the above four items into groups, we find that the tires alone cause 61.5 per cent of the total resistance, while the axle bearings and transmission up to neutral consume only 38.5 per cent. The conclusion is that the tires are responsible for nearly two-thirds of the power lost in the car itself. The above values are averages for speeds from 20 to 40 m.p.h. and as before stated the resistance changed little with the speed.

The discovery that 61.5 per cent of the internal power loss of this car is expended in the tires leads naturally to what becomes of this power. It is probable that friction of the material within the tire structure is continually taking place, due to flexure at the contact with the road. This absorption of work and production of heat is similar to the friction brake, except that the friction is produced by bending the fabric, not by sliding it.

Assuming the truth of these assumptions, it ought to be possible to calculate from the work absorbed the amount of heat generated, also the temperature of the tire surface when it reaches thermal equilibrium. These tires have 5.83 sq. ft.



Rolling Resistance—A—Rear wheels; fabric tire load on each wheel 772 lb. B—Rear wheels; fabric tire load on each wheel 550 lb. C—Front wheels; fabric tire load on each wheel 570 lb. D—Front wheels; cord tire load on each wheel 570 lb.

of surface, and the force of resistance at the circumference is 8.85 lb. At a speed of 30 m.p.h. there will be generated 1810 B. t. u. per hour, and to dissipate this heat to the air will require a rise of temperature of 30 deg. Fahr. above room temperature, based on a heat transfer coefficient of 8 B. t. u. deg. per hour. This calculation was made in advance of any experiments, but was later verified by running one of the 32 by 4 tires for half an hour at 30 m.p.h., after which the car was stopped and the surface temperature taken with a mercurial thermometer. The room temperature was 70 deg. Fahr. and the tire temperature was 107.5 deg. or a rise of 37.5 deg. as compared with the calculated rise of 39 deg. Fahr.

This experiment confirms the theory that tire resistance is caused by flexure of the material, and leads logically to the conclusion that resistance will be increased by under-inflation and by over-loading.

Of the factors affecting rolling resistance, inflation pressure is perhaps the most important. Very considerable changes of resistance may be caused by moderate changes of pressure. The load carried by the tire is also an important factor, which must be considered along with the inflation. It seems probable that for a given load there is a region of inflation below which the resistance increases very fast.

A. K. Brumbaugh, assistant engineer of the Autocar Co., in opening the discussion inquired whether any attempt had been made to ascertain the coefficient of friction between the drums and the tires with the drums rotating, his object being to determine whether slippage between drums and tires might cause friction which would result in heat.

Professor Lockwood stated that no attempt had been made to investigate this but that it was his impression that there was no slip between tires and drums. He added, however, that there was apparently a material difference in the composition of different tires tested, as with some tires considerable quantities of rubber were ground off and remained on the drums or on the floor in the form of scraps and dust. No tests on solid rubber tires had been attempted.

Professor Lockwood offered as his opinion that the heat generated was due entirely to the flexure of the tires and stated that the same rise of temperature resulted when either front or rear tires were tested.

B. D. Gray, vice-president of the Hess-Bright Mfg. Co., stated that in his opinion the loss attributed to the front wheel bearings was excessive and Professor Lockwood replied that the figures given in the appended table might not be as accurate as could be desired because they were made by a number of groups of men and not by an individual.

The meeting was attended by fourteen members. The next meeting is to be held Feb. 21 and the speaker will be Joseph A. Steinmetz, of Janney, Steinmetz & Co., who will give a lecture illustrated by lantern slides on the use of internal combustion engines in the European war. The slides will illustrate gasoline engines in use in submarines, aeroplanes, Russian war sleds, British tanks and the London aircraft defense.

Aeronautic Exhibition Full of Interest to Engineers

THE Pan-American aeronautic exhibition, which opens at Grand Central Palace in New York, Feb. 28, will be far the most interesting from an engineering viewpoint of all the exhibitions of aircraft that have ever been held. This is because in the Grand Central Palace we shall see many engines and other things evolved since the commencement of the war, things which are far in advance of anything appearing in European aviation shows 3 years ago. Examples of almost every type and every size of engine are expected, many of these being of European origin, although made in this country, as for example, the Hispano-Suiza motor, which will be shown by the Simplex Automobile Co., and the Gnome engine, which will be in the booth of the General Vehicle Co.

The aeronautic industry of America is now firmly on its feet. This exhibition may be said to mark the laying of the foundation stone of a new industry which may in time drive off the automobile trade in volume. The Society of Automotive Engineers, having recently amalgamated with the Society of Aeronautic Engineers, has seized upon the occasion of the exhibition to hold a 1-day aviation meeting which will take place on Friday, Feb. 9. There will be two sessions, one in the afternoon and one in the evening, both being held in the Engineering Societies Bldg. The afternoon will be given over to the discussion of aircraft standards. A number of men prominent in the industry have promised to take part, and there will be two papers, one entitled "Necessity of Standardization in Metal Parts for Aeronautic Use," by F. G. Diffin, and the other is by J. J. Rooney, who will make some suggestions regarding standard performance tests for aeroplanes.

Business in Afternoon

The afternoon session will really be a business session, in that the most important business of the industry just now is the standardization of details. It was recently stated that the chaos in the design of aviation engines is far worse than it used to be with automobile motors. For example: No engineer hesitates to use special bolts or special flanges in building an aviation engine, and there is no doubt that to permit a greater saving of weight bolts for such machines will differ from those required by the automobile industry. For aviation a much higher class of material is employed on the average and this affects the proportions of all parts. Still, although the little fittings required for aviation engines may differ from those needed in automobile construction, they can still be standardized.

Then there is the question as to the extent to which the metric system of measurement should be used. As was stated in THE AUTOMOBILE editorial last week, there is a very strong argument in favor of the extensive use of a millimeter. This will have to be debated, since there are plenty of people prepared to argue the other way. One thing is quite certain, that in all standardization work the aviation industry is going to adopt popular methods with the work already done by the S. A. E. What might be called the business of standards remains in the same hands and will be conducted by the same office. Thus, if the aeroplane engineers make up their minds what they want, the machinery for giving it to them is ready and waiting.

Evening Session Professional

The evening session will be purely professional, two papers being scheduled. One is entitled, Aerial Navigation Over Water, by Elmer A. Sperry, and the other, The Evolution of Aeroplane Wing Trussing, by Professor F. W. Pawlowski. Mr. Sperry's paper was originally scheduled for the winter meeting of the Society, but was among those which had to be taken by title, owing to lack of time for the discussion. It is also possible that Leigh M. Griffith will have some remarks to make on engine design.

There is no doubt that a great many automobile engineers who have so far taken no very strong interest in aviation will come to New York to see the exhibition, and any who have this intention should make a point of being present at the S. A. E. meeting, because the amount of information which will be given out in the papers in the discussion is bound to be very large indeed.

That the automobile and aviation industries are going to be

bound up together very closely is now quite certain. It is logical and natural but is by no means easy for an automobile engineer to turn to aviation work because the difference between a good automobile and a good aeroplane engine is extremely large, much larger than appears externally. The automobile engineer who wishes to get in touch with aviation has just got to make a very thorough study of the requirements, and there is no better way of gaining knowledge than by attending a meeting where several different viewpoints will be discussed.

The S. A. E. will have a booth at the show where they will display, among other things, examples of standard parts and specifications which can be of interest to the aeronautic industry. All members of the Society are entitled to two tickets for admission, which they can obtain by application in person at the society headquarters.

Constructional Details of Aeroplanes*

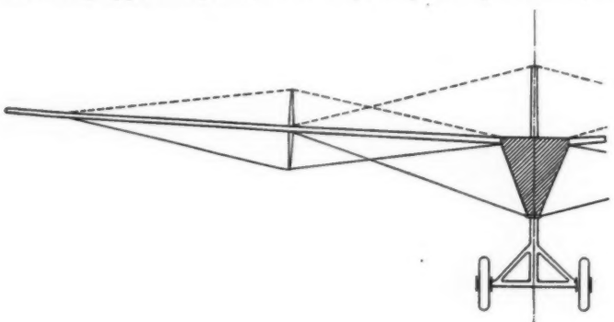
THE first attempts in building a flying machine were imitations of the flapping wings of birds. The problem was: how to make the big wing surfaces light and rigid at the same time and how to arrange the members of the wing framing. The paper considers the wing trussing used in monoplanes, giving a brief historical account of the development. The early work of Henson (1842-43), Lillienthal (1896), Pilcher (1899) and others is described. The author gives high credit to the early work of Henson and states that in his wing construction is found all the essential elements of the modern aeroplane wing, such as the front and rear spars and main and secondary ribs. In 1909 Levavasseur adopted the Henson construction almost without change for his Antoinette monoplane, as shown in Fig. 1.

The paper also describes a number of other types of monoplane wing trussing used in modern machines. The first simple and statically clear structure to combine the planes in the so-called biplane was designed by a bridge engineer. It was Octave Chanute who first used the bridge-truss in the biplane. This was the Pratt truss and was adopted immediately by all the aeroplane builders. The standard type is shown in Fig. 2. This construction prevails at the present time, the number of panels on each side varying from two to four in various constructions.

The author then describes the trussing methods used in the overhung type aeroplane as developed by Henry Farman, in the Ponier-Pagny, the Albatros and finally in the Curtiss machines, which make use of a wireless truss as shown in Fig. 3.

The paper states that trusses in triplanes can be treated along the same principles as in the biplanes and gives examples of correct and incorrect trussing for such machines. The subject of side bracing is considered at some length and illustrations are presented showing the construction used in a number of different machines.

The single-lift truss is compared with the double-lift truss. The author states that the only disadvantage of the former as against the latter is that it cannot be adopted for staggered biplanes. The single truss system has the following advantage, however. The strength of the struts varies as the least moment of inertia of the strut section. At a constant ratio of diameters of the strut section, the least moment of inertia varies as the fourth power of the thickness of the strut; and therefore the thickness of strut varies as the fourth root of the load that the strut can stand.



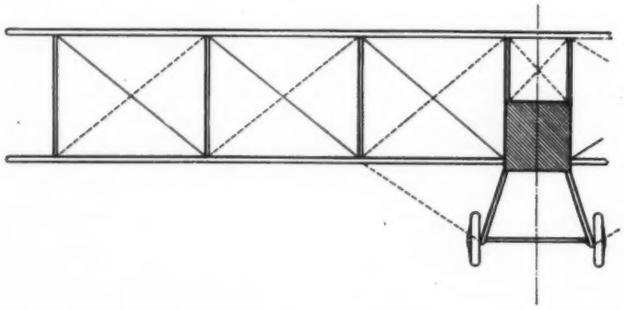


Fig. 1—Scientific form of trussing used first for experimental work in 1899 and adopted for the Antoinette monoplane. Below—Fig. 2—Standard type of biplane construction

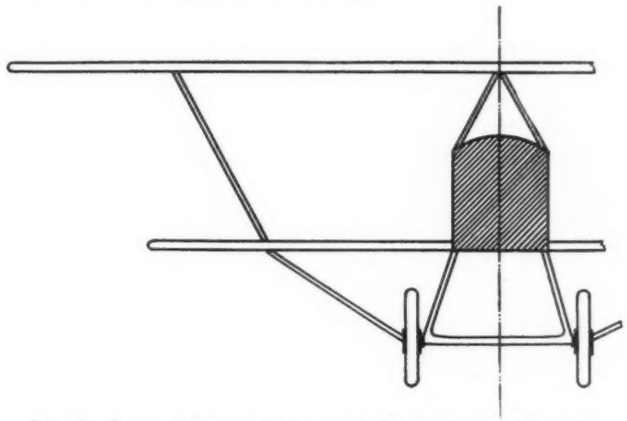


Fig. 3—Henry Farman design used for many machines, including the Curtiss

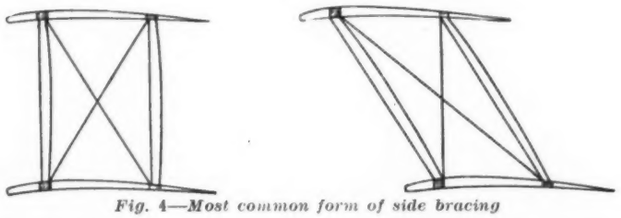


Fig. 4—Most common form of side bracing

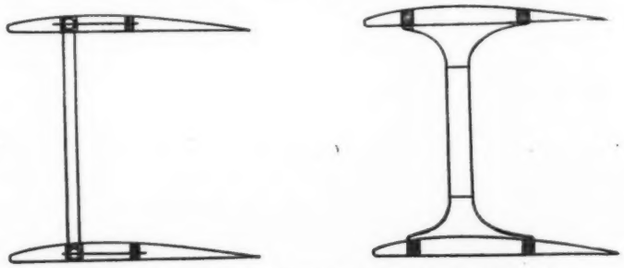


Fig. 5—Single lift, truss type of side bracing

*NOTE:—Abstract of paper to be presented by F. W. Pawlowski Assistant Professor of Mechanical Engineering, in charge of Aeronautic Course, University of Michigan, at the first Aeronautic Session of the Society of Automobile Engineers to be held Feb. 9, 1917.

Examples are given of side bracings of the so-called K-type, X-type, N-type and V-type. Fig. 4 shows the most common type of side bracing of biplane wings for machines of the so-called straight and stagered types. Fig. 5 shows a side bracing of the single-lift truss type; this was produced by Breguet in 1909. There are over 40 illustrations in the paper, showing almost every sort of constructional detail.

Aeroplane Parts Need Standardization

F. G. DIFFIN of the Erie Specialty Co., states in his paper that having had a large experience in the manufacture of metal parts and fittings, he would like to make suggestions for the improvement of conditions. As an example, he cites the fact that on a well known type of aeroplane there are over 3000 different parts made on screw machines, these calling for from two to ten operations.

Regarding the products of different aeroplane manufacturers, he has noticed a bolt used for practically the same purpose on the different machines ordered in over sixty different lengths and in eight different diameters. Furthermore, these bolts are not even standard with regard to the proportions of their heads, and they are asked for in many different kinds of steel. The author rightly remarks that there cannot be any two opinions about the size of a bolt head. It is either right or too weak or too strong.

It will be remembered that when the Society of Automotive Engineers took upon itself to standardize yokes and rod ends it discovered an enormous number of varieties in use. This seems to be the case with the aeroplane to-day, Mr. Diffin's company being called upon to furnish several hundred different designs. Including the different variables, he states that nearly a thousand separate items have to be manufactured. The same condition prevails with regard to eye bolts, terminals and sundry other parts, one particular trouble being in connection with castle nuts, since these are often required in nickel steel and are very difficult to make in that material.

Loss in Setting Up Tools

The sum total of all this is a large number of orders individually small. While Mr. Diffin remarks every order is called for with particular urgency, this means than an automatic machine tool cannot be started on a reasonably long run and quite a big proportion of the working day is to be charged to changing over and setting up machine tools.

Having regard to the fact that aircraft will require the very highest quality of materials, Mr. Diffin considers that the manufacture of small parts for aeroplanes will become a special business. To allow this business to develop properly will be to the greatest possible advantage to the aeroplane manufacturers, because it will allow them to purchase at shorter notice and at a much lower price. This means reasonable output and reasonable output of such things as bolts, yokes, etc., is only obtainable as a result of standardization. Mr. Diffin mentions the turnbuckle as being a part which will require special consideration. While it can probably be standardized it will be harder perhaps to obtain agreement as to the design than should be the case with bolts, rod ends and similar standard machine parts.

Standards Would Increase Safety

After tabulating the gains which would result from standardization, important among which is the fact that the government or private users would be able to obtain spare parts much more easily if these were standardized, Mr. Diffin goes on to say that the safety of flying should be greatly increased by the use of standard small parts. He remarks, and quite rightly, that a firm like his own, handling many different kinds of steel, has some difficulty in giving each its correct heat treatment, while in actual manufacture the smaller the number of parts to be made the more accurately can these be produced. The author makes a special appeal for consideration of the subject of steels, saying that "while at all times a high grade of material, far above the average commercial type, is demanded; full regard should be paid to the methods of economical production."

With respect to bolts, Mr. Diffin considers that 3½ per cent nickel steel is the best all-around material. He considers that a number of diameters now called for could be eliminated, and that a series of standard lengths could be set up. Dimensions of bolt heads must also be considered.

Regarding nuts, Mr. Diffin makes a plea for the use of cold rolled steel instead of nickel steel. First of all, these are much easier to make, especially when they are castellated, and secondly, it is easy to make the nut at least as strong as the bolt from which it fits even using a softer material for the nut than for the bolt.

Cannot Define Gasoline

(*Continued from Page* 292)

At the Washington meeting all the oil companies, both large and small with but a single exception opposed any kind of legislation whatsoever. They opposed it for two reasons:

(1) Because they believe it impossible to define the meaning of gasoline without increasing the price or restricting supply.

(2) Because laws mean inspectors, inspectors mean graft, graft means increased price or decreased profit.

The chief reason that a definition of gasoline is going to be almost impossible to make is that nobody, neither oil man nor automobile engineer, is at present able to say what gasoline ought or ought not to contain. There are just two things which are certain about it. Taking the engine of to-day, the fuel for it must contain some proportion of highly volatile spirit to allow it to be started. It must not contain more than a very small proportion of spirit with less than a certain degre of volatility. But practically nobody at the conference was able to place any definite mark on these limitations.

In order to understand the situation it is necessary to appreciate the meaning of a distillation curve. In testing gasoline a small measured quantity is put in a flask and is boiled away, the vapor being condensed and led to a graduated measuring glass; in the neck of the flask is a thermometer. The accepted method is to observe the temperature at which successive proportions of the liquid have been boiled off. For example, the temperature may be read when 20 per cent has passed over into the condenser, again when 50 per cent is gone, and again at 90 per cent.

Dry Point Important

Finally, as the last drop in the flask vanishes, we reach the "dry point" or "end point," where the temperature again should be observed. The temperature when boiling first starts is known as the initial point. A pretty good gasoline in the ordinary sense of the term would be something as follows: 25 per cent boiling off before reaching temperature of 225 deg. Fahr., 50 per cent boiling off before reaching a temperature of 265 deg. Fahr., 90 per cent boiling off before reaching a temperature of 340 deg. Fahr.; dry point, 400.

Now, there are very few gasolines on the market to-day with a dry point as low as 400; 450, which is well in the kerosene range, is quite usual. Dry points up to 500 are not uncommon. Furthermore, these high dry points can come in gasolines and be perfectly satisfactory in use. At present the engineers cannot say how high a dry point they are prepared to cope with. They cannot say how low an initial point they want. They cannot say whether they

want a curve which runs up very quickly and then goes along pretty nearly parallel to the base line; or whether they want a curve ascending in a smooth slope from the initial to the final temperature. The oil men apparently cannot help them.

Speaker after speaker after saying that the specification of gasoline was going to lead to trouble, to increased price and to waste (because we shall not need such volatile spirit next year as we need to-day), came eventually to the subject of fraud on the part of dishonest dealers and garagemen and others who handle the fuel.

Adulteration Frequent

A grave difficulty with gasoline is the large number of opportunities for adulteration which occur between the refining process and the time when the liquid goes into the tanks of the automobile. From the refiner the gasoline goes to the jobber, who buys from different sources and probably mixes different sorts by dumping different carloads in the same main tank. The jobber has the opportunity of adding to the gasoline something which he buys under a different name, such as kerosene or distillate. He may do this and yet produce a perfectly satisfactory fuel. There are gasolines on the market to be bought at the refineries which are actually improved by the addition of kerosene.

From the jobber the gas goes to the tank wagon, and a dishonest teamster has ample opportunity for adulterating the liquid it is his duty to deliver to the retailer. Six drivers in Detroit were recently caught making a fifty-fifty mixture of the jobber's gasoline and kerosene before delivering to the retailer. Finally, the retailer can again blend or mix just as the jobber can.

Here comes a very crucial point. If the refiner supplies a named or branded gasoline, the jobber who handles this or the retailer or anyone else who adds anything to it is guilty of fraud if from refinery to private motorist the product is sold under its brand all along the line. If, however, either jobber or retailer buys the branded gasoline, mixes something with it, and sells it as unnamed gasoline, he is not guilty of any fraud whatsoever.

It was reported to the bureaus by many of the speakers that a regular habit among a certain class of dealer is to buy a proprietary brand of gasoline and sell it at the marked figure—say, 18 cents—under its own name. They will take some of this, debase it by kerosene additions, and sell it under some fancy name of their own at a cent or two a gallon more, and the motorists buy the dearer product under the impression that it must be better. This, of course, is plain dishonesty, yet it is a kind of dishonesty which a few laws exist to stop. That it must be stopped somehow or other is obvious. Just how to stop it is at the present moment up to the Bureau of Mines and the Bureau of Standards, but they obtained very few concrete suggestions.

Throughout the country, legislatures, both State and municipal, are drafting bills to regulate the sale of gasoline. In a number of districts there are already laws in existence. Nearly all these legislatures are appealing to Washington to give them a rational basis for a law which will protect motorists from fraud, which will insure that when a man buys gasoline he gets what he wants, even although he is incapable of describing in scientific detail just what it is that he does want.

There is a very great deal to be said in favor of a definition of gasoline made by specified distillation curve limits. The fuel must be such that it will operate satisfactorily in a present-day engine. The engines of the future are going to burn almost anything in the way of liquid fuel. It will be a very short time before the motor which will both start and run on kerosene is at least as common as the gasoline engine. At that time what is to-day good gasoline will still be required to run the 3,000,000 cars now on our roads. The other machines, according to their degrees of ability, will be satisfied by 80 per cent, 60 per cent, or less.

It would be quite easy to handle gasoline in this way just as alcohol is handled commercially. Nobody ever sees pure alcohol. It is always sold in mixtures with so much per cent alcohol and so much water. We can do just the same with gasoline. A manufacturer will advertise his vehicle to operate on say 50 per cent gasoline, and the chances are that if gasoline were defined to-day, next year or the year after dealers would have in stock a little 100 per cent gasoline and a large quantity of 60 or 70 per cent. By this means it is argued the motorist would be able to know what he was buying.

Another recommendation is that a definition be established with a view that it be revised from year to year as occasion demands. The great cry of the oil men is that if any recommendation is placed on what is gasoline it will limit the amount of suitable motor fuel which can be produced from the wells. They also seemed to hold a general opinion that if a dealer has two grades or rather is selling at two prices, the majority of people will buy the dearer liquid. No positive evidence was produced in support of this somewhat extraordinary claim, yet it was again and again stated that a dealer who had fuel at two prices sold most of the dearer quite without regard to the respective qualities. At the same time it was agreed that what the users want is the cheapest possible fuel which will run their engines. This was stated over and over again and flatly contradicts the other statement. It would seem likely that the truth is that the average man is anxious to get the cheapest fuel possible and believes that by paying a higher price he will get something which will make starting easier.

Gravity Test Useless

On one point, and on one point only, was there complete unanimity, this being that gravity is no longer of any value whatsoever in specifying a motor fuel. Any specification ought to be a measure of volatility. Years ago the gravity or the Beaumé was a measure of volatility, but it is so no longer. A heavy fuel to-day can easily be more volatile than a lighter one.

The meeting, as already stated, was very well attended and it would take a column or more to give the names of all the important people present. To give just a few as showing the character of the meeting may be mentioned Dr. W. M. Burton of the Standard Oil Co. of Indiana, C. D. Chamberlain, secretary National Petroleum Assn., Dr. F. C. Robinson, chief chemist, Atlantic Refining Co., Mr. Grant, secretary, Independent Oil Men's Assn., R. L. Welch, secretary, Western Oil Jobbers' Assn., Guy Stevens, chief attorney, the Texas Co., J. C. McCabe, head of the department of safety engineering of the City of Detroit, Otto H. Klein, Board of Estimate and Apportionment, New York City. The Society of Automotive Engineers was represented by A. Ludlow Clayden, ex-chairman of the Standards Committee and H. L. Horning, member of the Council.

Representatives of many other individual oil companies and of several States and cities were also there and it was very noticeable that the oil companies usually had two or more men representing the legal side and the technical side. The chief chemist and chief attorney were a very usual pair.

The meeting was most wonderfully handled by Dr. C. W. Waidner of the Bureau of Standards. In passing a most hearty vote of thanks to the bureau, it was remarked that Dr. Waidner and his associates had throughout the 12 hr. exhibited no prejudice but had taken up the points, asked questions and argued details for the sole purpose of extracting the maximum of information. The words of Mr. Saybolt of the Standard Oil Co. of New Jersey were that the oil men are strong for the bureaus and strong for the work they are trying to do, and above all, strong for the way in which they are endeavoring to do it.

Worm-Gear Theory and Practice

Part II

THIS is the second of a series of articles extracted from the paper recently delivered by F. W. Lanchester before the British Institution of Automobile Engineers. This paper is of such length that it practically amounts to a text book on the subject. While it deals particularly with the advantages of the Lanchester or Hindley type of gearing, the portions devoted to worm and wheel mounting are applicable to the parallel type of worm gear also. It will probably rank as a standard work of reference for years to come.

IN the modern worm mounting, the type of bearing given in Fig. 8 has been long since abandoned, and to-day it is the invariable practice to separate the functions of radius load and thrust and provide for each by a bearing specially designed for the purpose. Thus in Figs. 12, 13, 14, and 15 a roller bearing is employed independent of the thrust, and in Figs. 18 and 20 and those which follow, it will be seen that the radial bearing commonly used is the symmetrical type of ball bearing as now to be obtained from several firms such as the Hoffmann, Skefko, Duplex, etc., and the thrust is independently carried. In some cases the radial bearing takes the form of a roller bearing, as in the worm wheel bearings already given.

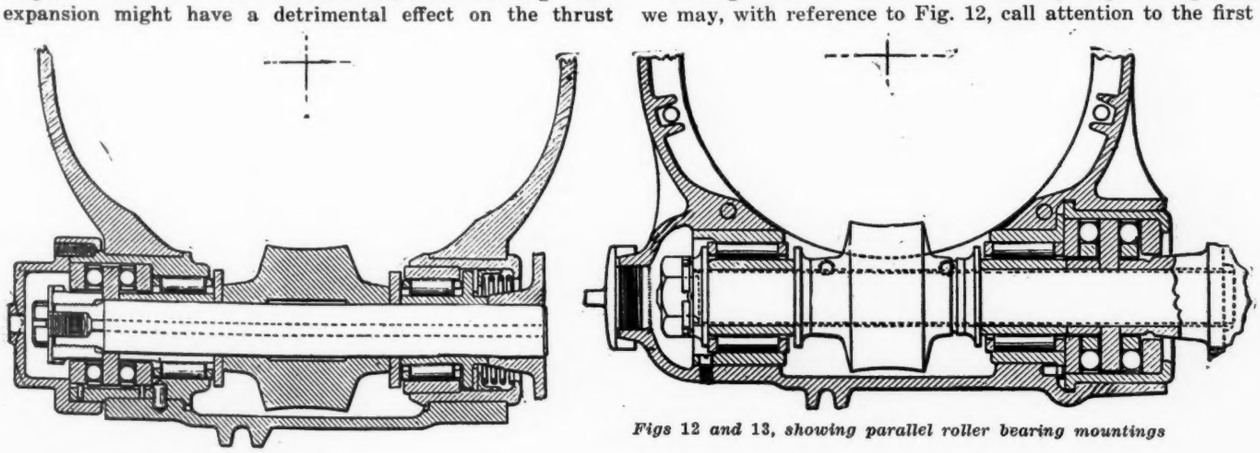
Double Thrust Best

It is worthy of note that in the modern mountings, the thrust bearing, a double thrust, is almost invariably fitted at one end. Objection has been taken to this arrangement on the ground that any inequality of expansion between the worm shaft and casing will throw the worm out of center, in other words, the objection is based on the fact that the arrangement is unsymmetrical. There are two answers to this. Firstly, the temperature difference is a mere "bagatelle"; thus the whole range of temperatures between the hottest and coolest parts of the gear box is included between an atmospheric temperature, say, 20 deg. C. and an upper extreme of about 100 deg. C.; speaking generally, the difference between one part and another does not exceed 40 deg. C. or 50 deg. C. At the worst, calculation gives the relative displacement of the worm center line and the wheel center line due to heating *as not exceeding two or three thousandths of an inch.* In practice it is doubtful whether it is ever as great as this: in any case it has not been found to be detrimental.

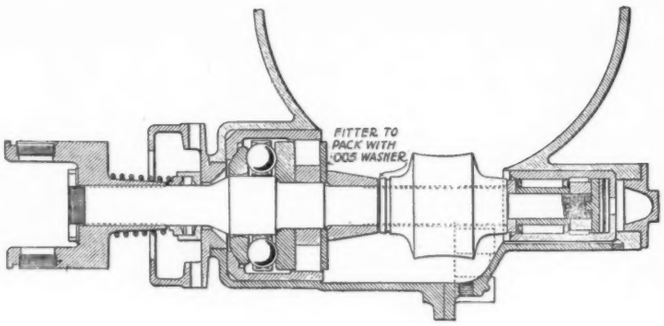
Secondly, if, as is the only alternative, the thrust and counterthrust be arranged at opposite ends of the worm shaft, there will be a much bigger expansion difference to take up between thrust and counterthrust, probably twice as great as that now between worm and thrust bearing. This expansion might have a detrimental effect on the thrust bearings and ultimately lead to their disintegration. The failure of a thrust bearing must be regarded as perhaps the worst "accident" which can happen to a worm gear while in service.

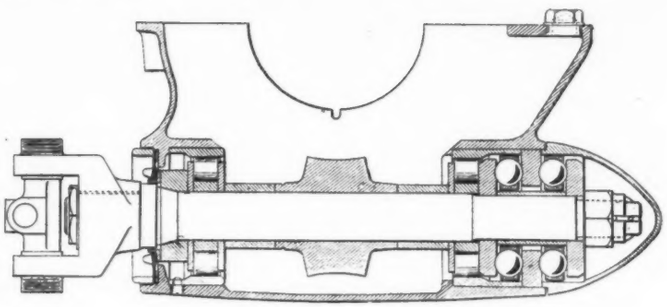
The author will now describe in detail a few of the later and more successful types of worm mounting, and some of those which are historically the more important. The first series which will be taken will be in continuation in Figs. 8 and 12, showing the historical development of worm mounting in the practice of the Lanchester Company. It will be noted on comparison of the figures given that there are certain features of the Lanchester mounting which have survived from the earliest designs, notably and which was used in the old Lanchester car built in 1897-8. The splined shaft on which the worm assemblage is mounted, also the method of building in the worm wheel as part of the balance gear box, and in providing for the housing in the worm wheel casting itself of the cross pin or pins on which the balance gear bevels are mounted. In this arrangement, which is common to the whole of the series, it will be seen that the drive from the bevel wheel is taken directly on the balance pinions, and the covers of the balance gear box are not used to convey torque but only the thrust and other forces by which the wheel is held in alinement. It will be noted that the thrust bearings serving the balance gear box take not only the worm thrusts but also the axle thrusts. There is a bronze pad fitted between the axle ends by which the thrust is conveyed from one axle to the other and thence to the thrust bearing. Another incidental feature which may be noted is the fact that there are four balance pinions in the differential gear box, each pair mounted on a transverse pin; the figures show clearly the means taken in the design of these cross pins to permit them to clear each other and to clear the axle ends and thrust pad. So far as the worm gear mounting is concerned, these are mere incidents, but the method by which the drive is conveyed from the worm wheel to the balance pinions is a matter which is essentially of interest.

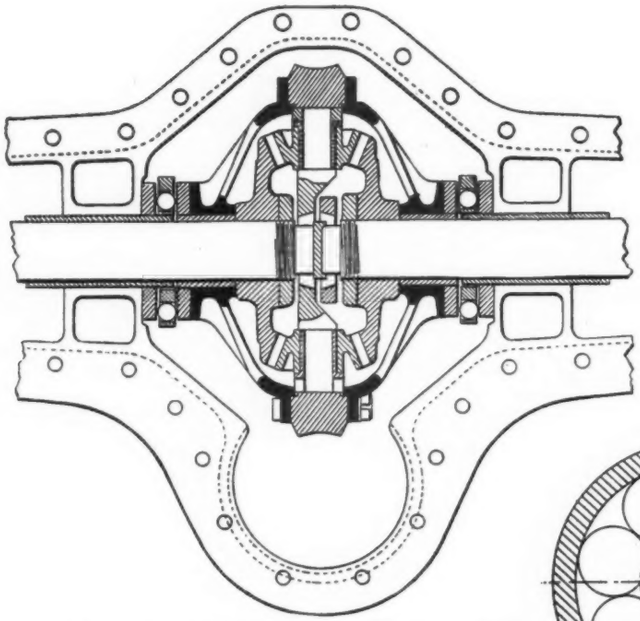
Coming back now to the more directly important points, we may, with reference to Fig. 12, call attention to the first

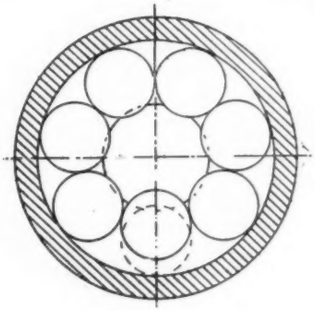


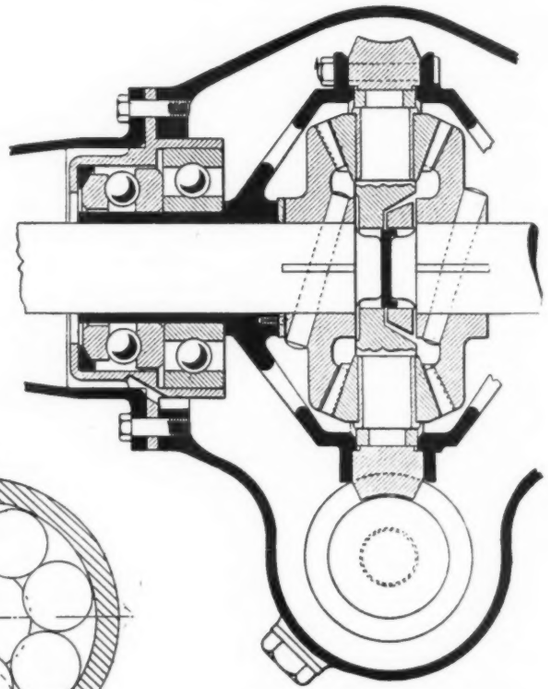
Figs 12 *and* 13, *showing parallel roller bearing mountings*











Figs. 14 and 15 showing worm and worm wheel mounting on early Lanchester cars. A plain thrust bearing was used for the worm for coasting or for reversing the ball thrust only operating while driving on the forward speeds Center—Fig. 16, showing assembly of "cheese" rollers in Lanchester bearing

Figs. 17 and 18 show later Lanchester designs still using the parallel type of roller bearing for mounting the worm, but with a double thrust ball race and no plain thrust

advance in worm mounting after the type shown in Fig. 8. In this we see that roller bearings brought well up to the neck of the worm have been substituted for the bicycle type of bearing in the previous figure, and a double ball thrust between flat parallel races has been applied at the tail end of the worm shaft. This design, again, was before the period in which ball or roller bearings could be purchased from specialized makers, and the bearings were made in every detail at the Lanchester Company's works. It will be seen that the thrust bearing in this design is very compact, but from the modern point of view and with present day loads and speeds it would not be considered adequate. Owing to the incline of the worm shaft and the importance of ground clearance, the tail position is at a disadvantage compared to the driving end of the worm shaft in the matter of permissible diameter, hence, when we pass to a later design, Fig. 13, in which the bearings (both cylinder and thrust) are far more robust, the thrust is fitted at the neck or forward end. In Fig. 14 (early 20 hp.), we find that the ball thrust bearing has again been arranged at the forward end of the worm, and in this design an innovation was tried experimentally to do away with the ball counterthrust and employ a series of thrust washers, the efficiency clearly being a matter of no importance when the brake is being employed. A notable feature in this design is the very large diameter of the thrust balls. Fig. 15 gives the corresponding section through the worm wheel axis. Here we see the spiral type of thrust bearing with flat races still holding its own.

A feature which is worthy of mention in many of these early mountings is the employment of the "cheese" type of roller bearing, that is to say, a type in which the length and diameters of the rollers are about equal. This is a type of bearing which the author developed in the experimental period of car building. The employment of this type of bearing was extended considerably in the 10-12 design in 1900, where it was used throughout the rear axle and parts of the countershaft. It is only within the last few years that bearings of this pattern have been taken up and introduced by the Hoffmann Mfg. Co. and others. There is a difference in practice inasmuch as the bearings marketed at the present day appear to be all fitted with cages, whereas in the author's experience a cage is absolutely unnecessary in bearings of the "cheese" roller type.

In any case the guiding of the roller is done from the ends, and this is really the definite distinction between the ordinary roller bearing and that of the "cheese" type in the former the roller being guided from its cylindrical surfaces, the cage being a necessity. Generally speaking, it has been the author's practice to so design the bearing that the rollers once in position could not fall out; thus, in the axle bearings shown in Fig. 9, the diameters of rollers and races were

such that the axle or central race could be removed and the rollers could not be displaced. The clearance was so small that the rollers would lock before they could come free.

A still later type of mounting is given in Fig. 17. On the worm bearings we again see the roller bearing of the cageless type employed, and a double thrust bearing on the tail end of the shaft. The whole outline of the worm housing, however, has been made very clean and smooth externally. The corresponding axle mounting is given in Fig. 18. Here it may be seen that on the axle bearing the ball has to some extent replaced the roller.

It may almost appear, in looking at these changes, that in some cases, in which the change goes from one arrangement to another, and then back again at a later date, there is certain evidence of infirmity of purpose. As a matter of fact, changes are frequently due to conditions which are temporary, and often two designs are so nearly equal in merit that whether one or the other be adopted is purely a matter of convenience. A great deal must depend upon whether the designer has a completely free hand or whether he is required to make use of standard components. It will be noted that amongst the various changes the practice of the Lanchester Company has always been to place the worm shaft below the axle.

Securing Alinement

One knotty point has existed throughout almost the whole history of gear box mounting, and that is the manner in which alinement is to be secured. There are four methods open: firstly, the parts may be made with sufficient mechanical exactitude to ensure perfect interchangeability and alinement within the necessary degree of accuracy. Secondly, a screw or other variable adjustment may be provided by which the necessary alinement may be secured in spite of individual variation in the parts. Thirdly, the method of using pen steel washers or "shims" may be adopted. Fourthly, an *accommodation piece* may be employed.

In the earliest type of mounting (already discussed, Fig. 8), the method of screw adjustment was employed, and up to a certain point was found satisfactory. It had the weakness, however, that, if the mountings were taken down, either the parts would have to be carefully marked, which might be forgotten, or in re-assembling an experienced hand would have to be employed,—who might not always be available. In brief, the screw adjusted mounting is not "foolproof." In departing from this the author endeavored to attain perfection and prescribed limits to the components and methods of gauging by which complete interchangeability was secured. This ideal, however, is extremely difficult to get carried out. The number of parts in the "mechanical circuit" is great, and, in order to avoid excessive variation in the aggregate, the individual limits require to be unusually fine. So long as all the components are made in the same works as the car the thing can be done, and it has been successfully done by the Lanchester Company. The difficulty, however, arises when it is desired to increase the output and bearings have to be purchased from firms who specialize in such commodities; the degree of accuracy to which they will guarantee to work is totally inadequate, in other words, bearing makers will not guarantee to work to thickness limits or width limits less than five one-thousandths of an inch, and if such limits were tolerated the total inaccuracy in the case of a worm mounting would amount to as many hundredths of an inch as it should be thousandths.

The author has never found it cheaper to work to a low degree of accuracy than to work to a high degree of accuracy; in other words, a thrust bearing can be produced which from face to face does not differ by more than a thousandth just as cheaply as it can be produced to within two or three one-thousandths. Whatever difference of cost there may be is more than compensated for by the advantage of interchangeability. In other words, the actual production of a part accurately to dimensions, that is to say, within fine limits, may be slightly greater, but in any complex piece of machinery the saving in cost of assemblage will pay the bill many times over.

The above is no mere ideal or unsupported opinion, it is based on hard experience. Some years ago, in designing certain mechanism (which need not be specified) every clearance dimension and tolerance dimension was set personally by the author's own hands, and these were worked to for a considerable time with satisfactory results. A new works manager, who did not believe in working to fine limits, reported that the limits were unduly fastidious and that money could be saved by relaxing the limits and so avoid having to scrap parts. The managing director consented and the scheme was tried. A slight and questionable reduction resulted in the cost of manufacturing components, but the increased cost of assembling and testing, and the cost of rectifying complaints, etc., became so great that the initial saving was swallowed up many times over. Within twelve months the scheme was abandoned and the old fine tolerances were restored, the expense of twice altering the gauges, etc. being a dead loss apart from the disastrous results of the experiment. The author thinks he could go further and say that he has never made an endeavor to do anything *better* than previously, without finding that when it is being done better it is also being done *cheaper*. Thus, the "splined shaft" was looked at by some as a piece of fantastic extravagance when first introduced, but it showed itself to be a money saver from the outset; it is far cheaper to cut a splined shaft and drift the hole to correspond, than it is to cut a key way and make and fit a key; also the job is incomparably better engineering when done. It is, perhaps, the more legitimate to cite this example since it was in connection with worm mountings that the splined shaft was first introduced into motor car practice; the worm shaft of the 10-12 hp. Lanchester car, Fig. 8, also the gear box, were, the author believes, the first applications of the splined shaft in the history of automobile engineering.

Interchangeability Difficult

Returning to the main point under discussion, it has been stated that though commercially possible, and probably advantageous, to fix the limits of the various components to secure perfect interchangeability in a worm gear mounting, it can only be done provided that the whole of the parts are made by the builders; at least in cases such as ball or roller bearings the offending dimensions must be rectified after they have been received from the manufacturer. There are commonly some eight parts or thereabouts of which the tolerance differences accumulate, and to attain perfect interchangeability the whole sum of these must be kept down to within four or five one-thousandths of an inch.

Admittedly the individual limits are fine. Owing to the difficulty of obtaining the necessary interchangeability, especially where ball bearings, etc., were ordered from outside sources, the Lanchester Co. have from time to time resorted to an accommodation piece, or have made use of "shims" in order to secure the necessary accuracy of alinement. There is more to be said in the case of a worm gear mounting for this practice than might appear to the idealist; it is, for example, admitted that the various components, thrust bearings, etc., are liable to a certain amount of wear; occasionally, also, the whole assemblage will be found to have developed internal slack, in which case the components may undergo considerable "punishment" and additional inaccuracy is introduced. Under these conditions the use of shims in the repair shop is fully justified, and a very good job indeed can be made if the points at which the shims are inserted are such as to present a sufficent area, and if the shims themselves are of pen steel or other suitable

hard grade of material. If this be not the case, there is always the danger of the shims being spun out or hammered out, and eventually disintegrating, in which case the parts may get loose in the gear box.

The Accommodation Piece

There is also the fourth expedient above given: the *accommodation piece*. In all interchangeable work in mechanical engineering a point may ultimately be reached when the accumulation of the tolerances of the individual components results in the individual limits having to be cut down to a point below anything which may be considered reasonable. It then becomes a question of judgment for the designer (as in the case of the worm gear under discussion) how the difficulty is to be met: one method is that of the *accommodation piece*. Thus one piece in the whole "mechanical circuit" is left to be fitted, or is made in several different standards of thickness. This is far better practice than to have a pretended interchangeability which does not really exist in which the accumulated tolerances do not come within the aggregate limit, and which in the assembling of a machine has to depend upon the *selection of compatible components*. Thus, on many pieces of mechanism at present being manufactured for the Government there are limits specified on the aggregate assemblages which are inconsistent with the limits permitted on the individual components, so that a manufacturer may make his components within the limits specified and yet he may not have a single assemblage which will go together. It is frequently true that it would be far easier to put finer limits on the individual components and devise means of working to them, but obviously, as already stated, there is a limit to what is commercially possible. When this limit is reached the alternative to the very unsatisfactory state of things above described is to make one of the components an *accommodation piece*, and either admit that part as a fitter's job, that is to say, allow it to be filed or otherwise adapted to the rest of the assemblage, or else to make that particular part in sufficient variety and confine the *selecting* to that one particular component.

In the worst or extreme cases given by these dimensions the difference amounts to 0.01-in. in the worm and wheel location; this may be taken as within the limits of good practice. It is clear from this example that a very high degree of accuracy in manufacture is necessary.

Difficulty with Shims

The difficulty mentioned in the case of "shims," namely, that they are liable to be spun or beaten out, is a difficulty met with more broadly and in a more general way in worm gear mountings. The parts intervening between the thrust and the worm appear in practice to need to be able to stand a lot of "punishment," and it is most important that no backlash shall exist. The consolidation of the worm shaft assemblage is usually provided for by pulling the whole string of components, namely, worm, distance piece, bearing ring, thrust washer, etc., thoroughly solid by a nut of ample proportions, as may be seen from the various figures. In some cases this nut has been locked by means of a caulking plate, in other cases the customary split cotter has been employed. Where the latter practice is adopted it is important that the nut shall be pulled thoroughly home before the hole is drilled for the split cotter, and even under these conditions there are certain objections to locking in this way. Owing to the trouble which has been found to develop if any initial backlash once makes its appearance, it has been the author's practice for some time to specify that all the components forming this compression assemblage shall be hardened, either being made of a high carbon steel or case-hardened according to circumstances. When this precaution is taken, and when the abutting areas are made sufficient, all trouble from the cause stated has been found to cease.

(*To be continued*)

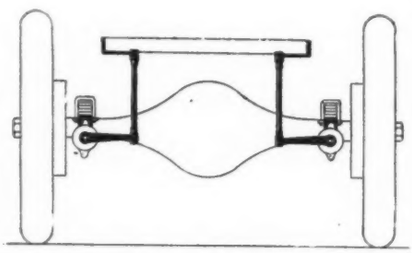
Pg. 344

Houdaille Shock Absorber of Hydraulic Type

HOUDAILLE hydraulic suspensions are built on the same basic principle as the recoil-absorbing devices in use on cannon, no frictional disks, equalizing springs, air compression, etc., being employed. Positive action is secured by using a rotary paddle type piston to compress castor oil and to force it through by-passes, subjecting it to abnormal pressure and thus automatically tempering the shock of excessive spring action. Recoil is prevented by the return of the oil from the compensating reservoir by means of suction.

Since the shock-eliminating effect is secured by passing the castor oil through the by-passes mentioned these passages must be more or less opened or closed, depending on the strength of the recoil of the car springs. Refilling the compensating reservoir once or twice a year with castor oil or glycerine is stated to be all that is necessary to maintain perfect working conditions. The reason for the use of one or the other of these liquids is that change of temperature does not alter their viscosity. When the temperature is much below freezing, however, the valve must be opened somewhat, the regulating operation consisting in turning a single screw connected with an indicator.

The manufacturer points out that Houdaille suspensions can be easily installed in any garage or repairshop. The accompanying illustrations show two methods of mounting. Fig. 1 shows the best manner for fitting the suspension to the rear axle. If the gasoline tank interferes with mounting the suspensions behind the axle they can be attached on the front side so as to be accessible for regulating and filling from the interior of the car by lifting the floorboards. Fig. 2 illustrates the method of attaching the suspension in cases where there is no convenient way of fitting to the axle.



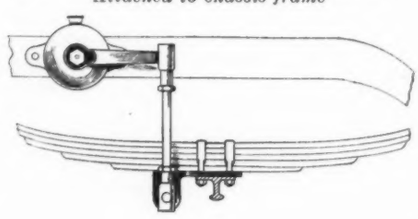


Fig. 1—Attached to rear axle. Fig. 2—Attached to chassis frame

When fitting the suspensions to the car care should be taken to see that the lever arm is horizontal when the car is loaded and that the vertical rod with ball joint at each end is perpendicular to the ground. Of course, it must be seen that the horizontal lever arm is entirely free to travel above and below the horizontal in accordance with spring flexure without interference.

The Houdaille Shock Absorber Co., Inc., 1737 Broadway, New York, was formed recently to push the manufacture of Houdaille suspensions in this country, the devices having previously been produced abroad, although Paul V. Clodio, who is interested in the new company, has controlled the patent rights in this country for years.

Industrial Miscellany

Winton Motor Car Co., Cleveland, will erect an additional $18,000 factory building in the near future.

Harris Automatic Machine Co., Niles, Ohio, will remove to Cleveland and occupy a $110,000 factory now being erected.

Aeromarine Plane & Motor Co. is having a factory built at Keyport, N. J., to be ready in a few months.

Sioux City Tire & Mfg. Co., Sioux City, Iowa, has let a contract for a $25,000 plant to be ready for occupancy next fall.

General Tire & Rubber Co., Akron, has been granted a permit to build a $50,000 addition to its plant.

Richard Auto Mfg. Co., Cleveland, plans to build factory extensions at 7800 Finney Avenue costing $40,000.

Sterns Tire Co., St. Louis, will turn out 1200 Sternwear tubes daily after Feb. 15 at the remodeled Efficiency Oil Co. plant, owned by the former company.

Huron Tractor Co., Detroit, will build a plant at Port Huron, Mich.

Goodyear Tire & Rubber Co. has started work on a 7-story, 110 x 120-ft. addition to its plant at Williamsville, Conn.

Ten Broeck Tyre Co., Louisville, Ky., will install cotton mill machinery in its plant and spin yarn and weave cotton fabrics.

Commercial Body Co., Bay City, Mich., a newly incorporated company, plans to build a factory.

Mayo-Skinner Mfg. Co., Chicago, will enlarge its production of automobile appliances by building a factory on Elston Avenue.

Willard Storage Battery Co., Cleveland, has taken out permits to build a $25,000 coal-handling plant and an $18,000 addition to its main building in East 131st Street.

Fisher Body Corp., Detroit, is erecting a new five-story factory having the latest modern improvements.

Packard Motor Car Corp., Detroit, has 9,000,000 lb. steel in its factory reserve material to protect the company against any shortage in the market.

Davis Mfg. Co., Milwaukee, has broken ground for a new machine shop at West Allis, Mich.

Acme Tire & Rubber Co., Toronto, Ont., plans to build a factory at Oakville, Ont.

Tuthill Spring Co., Chicago, has introduced new spring leaf fitting machinery into its factory.

Lasure Friction Clutch Pulley Co., Charles City, Ia., manufacturing clutch units for gasoline engines, has removed its plant and general offices to Madison,

The Automobile Calendar

ASSOCIATIONS

Feb. 13-14—St. Joseph, Mo., National Annual Convention Pikes Peak Ocean to Ocean Highway Assn.

CONTESTS 1917

April—Los Angeles to Salt Lake City Road Race.
May 19—New York Metropolitan Race on Sheepshead Bay Speedway.
May 30—Indianapolis Speedway Race, Championship.
June 9—Chicago, Ill., Speedway Race, Championship.
June 23 — Cincinnati, Ohio, Speedway Race.
July 4—Omaha, Neb., Speedway Race, Championship.
July 4—Tacoma, Wash., Speedway Race, Championship.
July 14 — Des Moines, Iowa, Speedway Race, Championship.
Aug. 4—Kansas City Speedway Race.
Sept. 3—Cincinnati, Ohio, Speedway Race, Championship.
Sept. 15 — Providence, R. I., Speedway Race, Championship.
Sept. 29—New York, Speedway Race, Championship.
Oct. 6—Kansas City Speedway Race.
Oct. 13 — Chicago, Speedway Race.
Oct. 27—New York Speedway Race.

SHOWS

Jan. 27-Feb. 3—Richmond, Va., First Annual, Gray's Armory.
Jan. 27-Feb. 3—Columbus, O., Show, Memorial Hall, Columbus Dealers' Assn.
Jan. 27-Feb. 3, 1917—Chicago, Ill., Show, Coliseum, National Automobile Chamber of Commerce.
Jan. 27-Feb. 3—Portland, Ore., Eighth Annual, Dealers' Motor Car Assn. of Oregon.
Jan. 27-Feb. 5 — York, Pa., Show, York Automobile Dealers' Assn.
Jan. 28-Feb. 3 — Wilmington, Del., Show, Hotel duPont.
Feb. 3-10—Minneapolis, Minn., Show, Minneapolis Automobile Trade Assn.
Feb. 5-9—Boston, 8th National Good Roads Show, Mechanics' Bldg.
Feb. 5-10—Indianapolis, E. W. Steinhart Bldg., Indianapolis Automobile Trade Assn.
Feb. 5-10—Bangor, Me., Bangor Automobile Assn., Auditorium.
Feb. 5-10—Indianapolis, Ind., Indianapolis Automobile Trade Assn., Steinhart Bldg.
Feb. 7-9 — Washington, Pa., Washington Automobile Dealers' Assn., Washington Amusement Co. Rink. C. B. McAllister, Sec.
Feb. 7-10 — Bay City, Mich., Automobile and Accessories, Armory, F. D. Shaver, Mgr.
Feb. 7-11 — Kalamazoo, Mich., State Armory, Kalamazoo Automobile Dealers' Assn.
Feb. 8-15—First Pan-American Aeronautic Exposition, New York City; Aero Club of America, American Society of Aeronautic Engineers, Pan-American Aeronautic Federations.
Feb. 10-17 — Harrisburg, Pa., Harrisburg Automobile Dealers' Assn., J. Clyde Myton, Mgr.
Feb. 10-17 — Hartford, Conn., Show, State Armory, First Infantry.
Feb. 10-18—San Francisco, Cal., Pacific Automobile Show, G. A. Wahlgreen, Mgr.
Feb. 12-17 — Bay City, Mich., Show, Armory.
Feb. 12-17 — Louisville, Ky., Show, First Regiment Armory, Louisville Automobile Dealers' Assn.
Feb. 12-17—Toledo, O., V. G. Kibby, 1017 Jefferson Ave.
Feb. 12-19 — Indianapolis, Ind., Show, Steinhart Bldg., Indianapolis Automobile Trade Assn.
Feb. 13-15—Grand Forks, N. D., Auditorium, Automobile Dealers' Assn.
Feb. 13-17 — Williamsport, Pa., Armory, John Kelly, Mgr.
Feb. 14-17—Peoria, Ill., Coliseum, Automobile and Accessory Dealers' Assn.
Feb. 15-17—Racine, Wis., Chas. A. Myers, Mgr.
Feb. 17-24—Albany, N. Y., Sixth Annual, State Armory, Albany Automobile Dealers' Assn.
Feb. 18 - 25 — St. Louis, Mo., Show, Automobile Manufacturers' and Dealers' Assn.
Feb. 19-24 — Springfield, Ohio, Show, Memorial Hall, Springfield Automobile Trade Assn.
Feb. 19 — Pittsfield, Mass., Show, Armory, J. J. Callahan, Mgr.
Feb. 19-24—Portland, Me., Exposition Building.
Feb. 19-24 — Grand Rapids, Mich., Show, Automobile Business Assn. of Grand Rapids.
Feb. 19-24 — Duluth, Minn. Show, Duluth Auto Dealers' Assn., Armory.
Feb. 19-24 — South Bethlehem, Pa., Show, Coliseum.
Feb. 19-24—Bridgeport, Conn., Show, Armory, Coast Artillery Corps.
Feb. 19-24—St. Louis, Overland Bldg., St. Louis, Auto Dealers' Assn.
Feb. 19-24—Syracuse, N. Y., Show, State Armory, Syracuse Dealers' Assn.
Feb. 19-24—Pittsfield, Mass., J. J. Callahan, Mgr.
Feb. 21-24—Flint, Mich., Coliseum, Lake Side Park, E. W. Jeffers, Mgr.
Feb. 24-Mar. 3—Newark, N. J., Show, First Regiment Armory.
Feb. 24-March 3 — Brooklyn, Show, 23rd Regiment Armory.
Feb. 24-Mar. 3—Atlanta, Ga., Automobile Dealers' Assn., Auditorium.
Feb. 26-March 3—Omaha, Neb., Show, Auditorium, Omaha Automobile Show Assn.
Feb. 26-Mar. 3—Utica, N. Y., Utica Automobile Dealers' Assn., State Armory.
Feb. 26-Mar. 3—Wilkes-Barre, Pa., Hugh B. Andrews, Mgr.
Feb. 27-March 4—Atlanta, Ga., Show, Auditorium, Atlanta Auto Trades and Accessory Assn.
March 1, 2, 3 — Urbana, Ill., Show, Automobile Trade Assn. of Champaign Co., Armory of the University of Ill.
March 3-10 — Boston, Mass., Show, Mechanics' Bldg., Boston Automobile Dealers' Assn.
Mar. 3-10—Washington, D. C., Middle Atlantic Motor Assn., Inc., Union Bldg.
Mar. 5-10—Jamestown, N. Y., Jamestown Automobile Dealers' Assn., Armory. C. A. Hanvey, Mgr.
Mar. 5-12—Birmingham, Ala., Auditorium.
Mar. 6-9—Fargo, N. D., A. Hanson, Mgr.
March 6-10—Ft. Dodge, Iowa, Northern Iowa Show, New Terminal Warehouse, G. W. Tremain, Secretary.
March 7-10—St. Joseph, Mo., Auditorium, St. Joseph Automobile Show Assn.
Mar. 12-17—Vancouver, B. C., British Columbia Automobile Assn., Horse Show Bldg.
March 13-16 — Fargo, N. D., Armory and Auditorium.
March 14-17—Mason City, Ia., Armory, Mason City Automobile Dealers.
March 14-17—Davenport, Iowa, Show, Coliseum Bldg., Tri-City Auto. Trade.
Mar. 17-21—Manitowoc, Wis., F. C. Borcherdt, Jr., Mgr.
March 17-22 — New Haven, Conn., Show, Hotel Taft.
Mar. 17-24—Pittsburgh, Pa., Motor Square Garden, J. J. Bell, Mgr.
March 18-23—Cedar Rapids, Ia., Cedar Rapids Automobile Trades Assn.
Mar. 19—Paterson, N. J., Sixth Annual, Auditorium, R. A. Mitchell, Mgr.
Mar. 21—Trenton, N. J., Second Regiment Armory. J. L. Brock, Mgr.
Mar. 27-31—Deadwood, S. D., Fifth Annual, Deadwood Auto Show. J. E. Nelson, Mgr.
Mar. 31-Apr. 14—Atlantic City, Garden Pier, S. W. Megill, Mgr.
April—Calumet, Mich., Show, Coliseum, Frank Ketchell, Mgr.
Apr. 4-7—Stockton, Cal., Second Annual San Joaquin Auto Trades Assn., Samuel S. Cohn, Mgr.
Sept. 2-9—Spokane, Wash., Interstate Fair.

Wis. The factory at 619 Williamson Street, Madison, has been equipped and is now producing fifty clutch pulleys daily.

Personals

C. A. **Bonniwell** has joined the staff of H. Walton Heegstra, Inc., merchandising and advertising service, of Chicago. Mr. Bonniwell for the past 2 years has been assistant sales and advertising manager of the Auburn Automobile Co., Auburn, Ind.

F. C. **Rockwell**, a former well-known Boston automobile dealer, has taken the Metz agency for Los Angeles, Cal., where he has gone into partnership with B. I. Carpenter and R. I. Carpenter, both New York automobile men.

E. M. **Nolen** and F. W. **Thurnau** have joined the staff of Vanderhoof, Condict and Comrie, advertising agents of Chicago. Mr. Nolen is vice-president and director of merchandising. He has been associated with the advertising work of Stutz, Cole, Pathfinder and other automobile companies. Mr. Thurnau has been with Dunlop Ward Co. for 3 years.

W. F. **Hirst** has resigned his position as factory manager of the Brown Lipe Gear Co., Syracuse, N. Y. He will announce his plans shortly.

F. E. **Brown** will open the Southern branch of the Ohio Puncture Plugger Sales Co., Columbus, Ohio, at New Orleans early in February.

Allan R. Pye and **Charles Helm** have been elected vice-president and secretary respectively of the Britton Co., Hartford, Conn. They were taken into the firm in recognition of their work as the two employees oldest in the service.

William Nantarro has been appointed superintendent of the body building department of the Kent Motors Corp. factory, Newark, N. J. He was formerly with J. M. Quinby & Co., Newark.

F. W. A. **Vesper** has been elected a director of the St. Louis Chamber of Commerce. He is president of the Vesper-Buick Automobile Co.

L. G. **Peed** has joined the staff of the Willys-Overland Co. in New York. He was formerly manager of the Philadelphia branch of the Maxwell Motor Sales Corp.

S. D. **Briggs** of Minneapolis, northwestern representative for the Hupmobile, has sailed for a tour of France, England, Spain, the Far East and other countries in the interests of the Hupmobile.

M. A. **Purvin** has been made manager of the Chicago office of the United Smelting & Aluminum Co., New Haven.

Roy L. Sergeant has been appointed general manager for the Pacific Coast for the Fisk Rubber Co. He was formerly in charge of the south coast district.

Nelson T. Scott has been appointed superintendent of traffic of the Kent Motors Corp., Newark, N. J. He was formerly with the American Electric Works.

Walter Brady has resigned from the sales department of the United States Tire Corp., Detroit. He will announce his new connection later.

Dealers

Firestone Tire & Rubber Co. opened its handsome new service station at Los Angeles on Jan. 31 with a city-wide celebration in which municipal officials and delegates from all parts of the Far West participated. The building is three stories high and has 30,000 sq. ft. of floor space. It is built of stucco and reinforced concrete, ornamented with Egyptian tile and having mission balconies. It has a storage capacity of 7500 casings.

McMullen & Lee, Chevrolet representatives in Toronto, have also acquired the selling rights for the Studebaker for Toronto and district.

Tire Service House, Seattle, has moved from its old quarters on East Pike Street near Broadway to its new home at 615 East Pine Street.

Pacific KisselKar Co., Portland, Ore., has taken the agency for the Ford car in Portland and surrounding territory in western Oregon.

Arensburg Automobile Supply Co., Seattle, has moved from its quarters at the corner of Summit Avenue and Pine Street to 906 East Pike Street.

Seattle Branch of the Pacific Kissel-Kar Co. has taken the agency for the Federal truck. The Gerlinger Motor Car Co. of this city, which has been handling this agency for the last 2 years, will hereafter sell the Gersix truck.

Willard Storage Battery Co. is erecting a two-story garage and service station in Detroit.

Waterhouse-Sands Motor Car Co., Seattle, has taken the agency for the Kelly-Springfield tires in Seattle and vicinity, with D. H. Coulsin as manager.

Tennessee Auto Sales Co., Memphis, Tenn., will handle Troy trailers in the State of Tennessee and northern Mississippi.

L. C. Auto Co., Jackson, Mich., has been incorporated to handle Jackson, Peerless and Federal truck lines in that territory. It will occupy a new service station at 218 West Pearl Street about April 1.

Maxfer Truck & Tractor Co., Chicago, has named Genereux & Co., 5-7 Houston Street, as distributors for New York, and Nickerson & Schroeder, 1078 Bedford Avenue, for the Greater New York territory.

H. G. Moock, Denver, Woods distributor for Colorado and Wyoming, has added Mercer distributing agency for same territory.

Ouray Motor Sales Co., Ouray, Col., has secured Dodge agency for Ouray County.

MacFarland Auto Co., Denver, for several years Packard and Buick distributor for Colorado and part of Wyoming, has sold out the Packard business and is handling Buick exclusively in same territory.

R. E. Williams Motor Car, Denver, Abbott-Detroit distributor for Colorado and part of Wyoming, has added the Peerless retail agency for Denver and vicinity.

Lexington Colorado Auto Co., Denver, has opened a Lexington distributing agency for Colorado, Wyoming and New Mexico at 721 Seventeenth Street.

Overland Stores Co., Toledo, Ohio, John Willys, president, has contracted for the erection of a three-story building for sales and service purposes in Detroit.

Chalmers cars will be handled in Memphis (Tenn.) territory by Eugene Polk, who has opened a sales and service establishment. Mr. Polk was formerly the Chalmers agent at Little Rock, Ark.

Southern Auto & Electric Co., Little Rock, Ark., has taken the Westcott.

Service Auto & Ignition Co., Denver, has opened an agency and official service station for Eveready storage batteries and Westinghouse, Bijur, Dyneto and Disco starting and lighting systems.

Bour-Davis Motor Car Co., Detroit, is appointing district sales managers for the entire United States.

Canadian Auto Sales Co., Ltd., 145 Bay Street, Toronto, Ont., has been appointed distributor of the Velie and Hollier cars.

Brewer Motor Co., eastern Washington distributors of the Saxon, has established a branch in Walla Walla, Wash., to handle Walla Walla and Columbia Counties. J. P. Welch has been appointed manager of the branch.

Oregon Motor Car Co., Portland, Ore., has been appointed agent for the Locomobile Company of America in the State of Oregon.

Des Moines branch of the Michelin Tire Co. has been closed and the Michelin business for the State has been taken over by the Hippee Motor Supply Co.

Mackie Motor Co., Des Moines, Iowa, will take over the State of Iowa for the sale of the Chalmers. The Iowa Auto & Supply Company, which has held the Chalmers agency here for several years, discontinued same on Jan. 1 to take on a new line of cars.

Ballou & Wright, Seattle, have taken the western Washington agency for the Smith junior car.

A. J. Miller Co., Bellefontaine, Ohio, will erect a three-story plant to use for assembling automobiles and for offices.

V. E. Schevenell Co., Memphis, Tenn., has been named distributor for Princess cars in Tennessee, Alabama, Mississippi and Arkansas.

P. J. Durham Co., 244-250 West Forty-ninth Street, New York, has opened a Newark, N. J., branch at 23 Central Avenue as New Jersey headquarters for the distribution of Gray & Davis products.

Peerless Motor Car Co., Cleveland, has appointed the Morgan-Farr Motor Co., Newark, N. J., distributor over the northern New Jersey territory. This company also handles the Munroe.

Edgar F. Sanger Co., 156 Farwell Avenue, Milwaukee, distributor of Stearns-Knight and Hupmobile cars, has incorporated the business under the same style. The capital stock is $25,000. E. F. Sanger is president and general manager of the company.

Republic Motor Car Co., Cole distributor, has also taken the Maxwell.

A. F. Hieronimous, Jr., Columbus, has taken the central Ohio agency for the Haynes.

White Motor Sales Co. has been organized to handle the White line in Columbus, including both cars and trucks.

La Crosse Auto Co., Minneapolis, selling the Dort, has moved to new quarters at 1203 Hennepin Avenue.

Ben Hur Co., St. Louis, A. H. Truscott, manager, has leased space in the Plaza Hotel building, 3306 Locust Street.

Day-light Garage, 345 East Thirty-third Street, Baltimore, Md., is distributing the Acme truck in this city. Anne Arundel, St. Mary's, Hartford, Cecil and Prince George's counties.

Chevrolet Northwest Co., Seattle, Wash., will hereafter be known as the W. S. Dulmage Motor Car Co.

Bimel Motor Car Co., St. Louis, has been organized to sell Bimel cars. The new company has rented display space from the Bart S. Adams Tire Co., 4701 Washington Avenue.